California High School Exit Examination

Mathematics
Released Test Questions

California Department of Education
January 2008

Introduction

All California public school students must satisfy the California High School Exit Examination (CAHSEE) requirement, as well as all other state and local requirements, in order to receive a high school diploma.

The CAHSEE is divided into two parts: English-language arts and mathematics. All questions on the CAHSEE are evaluated by committees of content experts, including California educators, teachers, and administrators, to ensure the questions' appropriateness for measuring the designated California academic content standards in English-language arts and mathematics. In addition to content, all items are reviewed and approved to ensure their adherence to the principles of fairness and to ensure no bias exists with respect to characteristics such as gender, ethnicity, and language.

This document combines released test questions that have appeared on the mathematics part of the CAHSEE since the 2000-2001 school year, and contains new test questions from the 2006-2007 school year. A similar document for English-language arts is also available. The questions are grouped by strand (e.g., Number Sense). At the beginning of each strand section is a list of the specific standards assessed on the CAHSEE. Following a group of questions is a table that gives the correct answer for each question, the content standard each question is measuring, and the year each question originally appeared on the CAHSEE.

The following table lists each strand, the number of items that appear on the exam, and the number of released test questions that appear in this document.

STRAND	NUMBER OF QUESTIONS ON EXAM	NUMBER OF RELEASED TEST QUESTIONS
• Number Sense (NS)	14	35
• Statistics, Data Analysis, and Probability (PS)	12	28
• Algebra and Functions (AF)	17	36
• Measurement and Geometry (MG)	17	41
• Mathematical Reasoning (MR)	8	22
• Algebra I (1A)	12	35
TOTAL	**80**	**197**

In selecting test questions for release, three criteria are used: (1) the questions adequately cover the content standards assessed on the CAHSEE; (2) the questions demonstrate a range of difficulty; and (3) the questions present a variety of ways each standard can be assessed. These released test questions do not reflect all of the ways the standards may be assessed. Released test questions will not appear on future tests.

For more information about the CAHSEE, visit the CDE's Web site at http://www.cde.ca.gov/ta/tg/hs/.

NUMBER SENSE

The following ten California mathematics academic content standards from the Number Sense strand are assessed on the CAHSEE by 14 test questions and are represented in this booklet by 35 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 7 — NUMBER SENSE	
Standard Set 1.0	**Students know the properties of, and compute with, rational numbers expressed in a variety of forms:**
1.1	Read, write, and compare rational numbers in scientific notation (positive and negative powers of 10) with approximate numbers using scientific notation.
1.2	Add, subtract, multiply, and divide rational numbers (integers, fractions, and terminating decimals) and take positive rational numbers to whole-number powers.
1.3	Convert fractions to decimals and percents and use these representations in estimations, computations, and applications.
1.6	Calculate the percentage of increases and decreases of a quantity.
1.7	Solve problems that involve discounts, markups, commissions, and profit, and compute simple and compound interest.
Standard Set 2.0	**Students use exponents, powers, and roots, and use exponents in working with fractions:**
2.1	Understand negative whole-number exponents. Multiply and divide expressions involving exponents with a common base.
2.2	Add and subtract fractions by using factoring to find common denominators.
2.3	Multiply, divide, and simplify rational numbers by using exponent rules.
2.4	Use the inverse relationship between raising to a power and extracting the root of a perfect square integer; for an integer that is not square, determine without a calculator the two integers between which its square root lies and explain why.
2.5	Understand the meaning of the absolute value of a number; interpret the absolute value as the distance of the number from zero on a number line; and determine the absolute value of real numbers.

Number Sense

1. The radius of the earth's orbit is 150,000,000,000 meters. What is this number in scientific notation?

A 1.5×10^{-11}

B 1.5×10^{11}

C 15×10^{10}

D 150×10^{9}

M00213

2. $\mathbf{3.6 \times 10^{2} =}$

A 3.600

B 36

C 360

D 3,600

M00036

3. Which expression represents 0.0000007 in scientific notation?

A 7×10^{-9}

B 7×10^{-7}

C 7×10^{7}

D 7×10^{9}

M20956

4. The five members of a band are getting new outfits. Shirts cost $12 each, pants cost $29 each, and boots cost $49 a pair. What is the total cost of the new outfits for all of the members?

A $90

B $95

C $450

D $500

M00331

5. $\mathbf{\frac{11}{12} - \left(\frac{1}{3} + \frac{1}{4}\right) =}$

A $\frac{1}{3}$

B $\frac{3}{4}$

C $\frac{5}{6}$

D $\frac{9}{5}$

M02048

6. Which of the following numerical expressions results in a negative number?

A $(-7) + (-3)$

B $(-3) + (7)$

C $(3) + (7)$

D $(3) + (-7) + (11)$

M00116

7. One hundred is multiplied by a number between 0 and 1. The answer has to be—

A less than 0.

B between 0 and 50 but not 25.

C between 0 and 100 but not 50.

D between 0 and 100.

M00275

Number Sense

8. **John uses $\frac{2}{3}$ of a cup of oats per serving to make oatmeal. How many cups of oats does he need to make 6 servings?**

A $2\frac{2}{3}$

B 4

C $5\frac{1}{3}$

D 9

M23015

9. **If Freya makes 4 of her 5 free throws in a basketball game, what is her free throw shooting percentage?**

A 20%

B 40%

C 80%

D 90%

M00223

10. **Some students attend school 180 of the 365 days in a year. About what part of the year do they attend school?**

A 18%

B 50%

C 75%

D 180%

M00047

11. **What number equals $\frac{3}{8}$?**

A 0.267

B 0.375

C 2.67

D 3.75

M13470

12. **The cost of an afternoon movie ticket last year was $4.00. This year an afternoon movie ticket costs $5.00. What is the percent increase of the ticket from last year to this year?**

A 10%

B 20%

C 25%

D 40%

M02158

13. **The weekly sales of a magazine increased from 500,000 to 600,000. By what percentage did the magazine sales increase?**

A 17%

B 20%

C 83%

D 120%

M11242

14. **Traditions Clothing Store is having a sale. Shirts that were regularly priced at $20 are on sale for $17. What is the percentage of decrease in the price of the shirts?**

A 3%

B 15%

C 18%

D 85%

M30820

Number Sense

15. Sally puts $200.00 in a bank account. Each year the account earns 8% simple interest. How much interest will be earned in three years?

A $16.00
B $24.00
C $48.00
D $160.00

M02119

16. A pair of jeans regularly sells for $24.00. They are on sale for 25% off. What is the sale price of the jeans?

A $6.00
B $18.00
C $20.00
D $30.00

M02870

17. A CD player regularly sells for $80. It is on sale for 20% off. What is the sale price of the CD player?

A $16
B $60
C $64
D $96

M02425

18. Jana bought a car for $4200 and later sold it for a 30% profit. How much did Jana sell the car for?

A $1260
B $2940
C $5460
D $7140

M10580

19. A salesperson at a clothing store earns a 2% commission on all sales. How much commission does the salesperson earn on a $300 sale?

A $6
B $15
C $60
D $150

M20470

20. Which number equals $(2)^{-4}$?

A -8
B $-\frac{1}{16}$
C $\frac{1}{16}$
D $\frac{1}{8}$

M10015

21. $\frac{10^{-2}}{10^{-4}} =$

A 10^{-6}
B 10^{-2}
C 10^{2}
D 10^{8}

M02832

22. Which of the following is equivalent to $7^{-6} \cdot 7^{4}$?

A 7^{-24}
B 7^{-10}
C 7^{-2}
D 7^{2}

M12679

Number Sense

23. Which fraction is equivalent to $\frac{5}{6}+\frac{7}{8}$?

A $\frac{35}{48}$

B $\frac{6}{7}$

C $\frac{20}{21}$

D $\frac{41}{24}$

M12713

24. Which of the following is the prime factored form of the lowest common denominator of $\frac{7}{10}+\frac{8}{15}$?

A 5×1

B $2 \times 3 \times 5$

C $2 \times 5 \times 3 \times 5$

D 10×15

M02826

25. What is $\frac{3}{4}-\frac{1}{6}$?

A $\frac{1}{6}$

B $\frac{1}{3}$

C $\frac{7}{12}$

D $\frac{11}{12}$

M13552

26. $\left(3^8\right)^2 =$

A 3^4

B 3^6

C 3^{10}

D 3^{16}

M02406

27. $4^3 \bullet 4^2 =$

A 4^5

B 4^6

C 16^5

D 16^6

M02661

28. What is $6^2 \bullet 2^2$?

A 32

B 48

C 144

D 256

M22029

29. What is the value of $\frac{2^6 \bullet 2^4}{2^5}$?

A 4

B 10

C 16

D 32

M25206

30. The square root of 150 is between—

A 10 and 11.

B 11 and 12.

C 12 and 13.

D 13 and 14.

M02666

Number Sense

31. The square of a whole number is between 1500 and 1600. The number must be between—

A 30 and 35.

B 35 and 40.

C 40 and 45.

D 45 and 50.

M00313

32. Between which two integers is the value of $\sqrt{61}$?

A 6 and 7

B 7 and 8

C 8 and 9

D 9 and 10

M22059

33. If $|x| = 3$, what is the value of x?

A -3 or 0

B -3 or 3

C 0 or 3

D -9 or 9

M02122

34. What is the absolute value of -4?

A -4

B $-\frac{1}{4}$

C $\frac{1}{4}$

D 4

M02667

35. Which number has the greatest absolute value?

A -17

B -13

C 15

D 19

M12795

Number Sense

Question Number	Correct Answer	Standard	School Year of Exam
1	B	7NS1.1	2001-2002
2	C	7NS1.1	2000-2001
3	B	7NS1.1	2006-2007
4	C	7NS1.2	2001-2002
5	A	7NS1.2	2001-2002
6	A	7NS1.2	2000-2001
7	D	7NS1.2	2000-2001
8	B	7NS1.2	2003-2004
9	C	7NS1.3	2001-2002
10	B	7NS1.3	2000-2001
11	B	7NS1.3	2005-2006
12	C	7NS1.6	2001-2002
13	B	7NS1.6	2004-2005
14	B	7NS1.6	2006-2007
15	C	7NS1.7	2001-2002
16	B	7NS1.7	2000-2001
17	C	7NS1.7	2000-2001
18	C	7NS1.7	2003-2004
19	A	7NS1.7	2004-2005
20	C	7NS2.1	2002-2003
21	C	7NS2.1	2001-2002
22	C	7NS2.1	2003-2004
23	D	7NS2.2	2002-2003
24	B	7NS2.2	2000-2001
25	C	7NS2.2	2003-2004
26	D	7NS2.3	2001-2002
27	A	7NS2.3	2000-2001
28	C	7NS2.3	2005-2006
29	D	7NS2.3	2006-2007
30	C	7NS2.4	2001-2002
31	B	7NS2.4	2000-2001
32	B	7NS2.4	2005-2006
33	B	7NS2.5	2001-2002
34	D	7NS2.5	2000-2001
35	D	7NS2.5	2005-2006

STATISTICS, DATA ANALYSIS, AND PROBABILITY

The following seven California mathematics academic content standards from the Statistics, Data Analysis, and Probability strand are assessed on the CAHSEE by 12 test questions and are represented in this booklet by 28 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 6 — STATISTICS, DATA ANALYSIS, AND PROBABILITY	
Standard Set 1.0	**Students compute and analyze statistical measurements for data sets:**
1.1	Compute the ~~range~~, mean, median, and mode of data sets.*
Standard Set 2.0	**Students use data samples of a population and describe the characteristics and limitations of the samples:**
2.5	Identify claims based on statistical data and, in simple cases, evaluate the validity of the claims.
Standard Set 3.0	**Students determine theoretical and experimental probabilities and use these to make predictions about events:**
3.1	Represent all possible outcomes for compound events in an organized way (e.g., tables, grids, tree diagrams) and express the theoretical probability of each outcome.
3.3	Represent probabilities as ratios, proportions, decimals between 0 and 1, and percentages between 0 and 100 and verify that the probabilities computed are reasonable; know that if *P* is the probability of an event, 1 - *P* is the probability of an event not occurring.
3.5	Understand the difference between independent and dependent events.

GRADE 7 — STATISTICS, DATA ANALYSIS, AND PROBABILITY	
Standard Set 1.0	**Students collect, organize, and represent data sets that have one or more variables and identify relationships among variables within a data set by hand and through the use of an electronic spreadsheet software program:**
1.1	Know various forms of display for data sets, ~~including a stem-and-leaf plot or box-and- whisker plot;~~ use the forms to display a single set of data or to compare two sets of data.*
1.2	Represent two numerical variables on a scatterplot and informally describe how the data points are distributed and any apparent relationship that exists between the two variables (e.g., between time spent on homework and grade level).

* The crossed-out portion of this standard is not assessed on the CAHSEE, but is still included in grade-level standards.

Statistics, Data Analysis, and Probability

36. Donald priced six personal Compact Disc (CD) players. The prices are shown below.

$21.00, $23.00, $21.00, $39.00, $25.00, $31.00

What is the median price?

A $21.00

B $24.00

C $27.00

D $30.00

M02964

37. Rico's first three test scores in biology were 65, 90, and 73. What was his mean score?

A 65

B 73

C 76

D 90

M02247

38. The chart below shows the mathematics test scores of three students.

Mathematics Test Scores

	Test 1	Test 2	Test 3	Test 4
Parisa	7	8	10	6
Hector	6	7	9	10
Charles	8	10	10	9

What is Hector's mean score?

A 6

B 7

C 8

D 9

M00124

39. The box below shows the number of kilowatt-hours of electricity used last month at each of the houses on Harris Street.

620, 570, 570, 590, 560, 640, 590, 590, 580

What is the mode of these data?

A 560

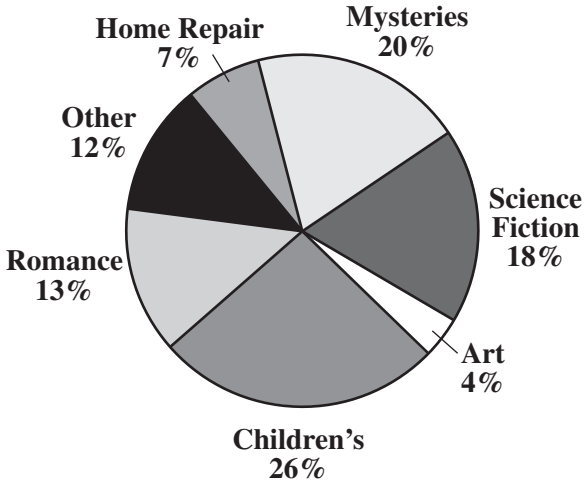
B 580

C 590

D 640

M12248

40. The Smithburg town library wanted to see what types of books were borrowed most often.



According to the circle graph shown above—

A more Children's books were borrowed than Romance and Science Fiction combined.

B more than half of the books borrowed were Children's, Mysteries, and Art combined.

C more Mysteries were borrowed than Art and Science Fiction combined.

D more than half of the books borrowed were Romance, Mysteries, and Science Fiction combined.

M02131

41. Three-fourths of the 36 members of a club attended a meeting. Ten of those attending the meeting were female. Which one of the following questions can be answered with the information given?

A How many males are in the club?

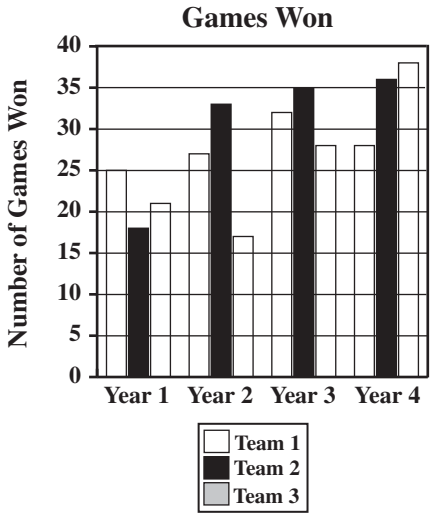
B How many females are in the club?

C How many male members of the club attended the meeting?

D How many female members of the club did not attend the meeting?

M00261

42. The number of games won over four years for three teams is shown on the graph below.



Which statement is true based on this information?

A Team 3 always came in second.

B Team 1 had the best average overall.

C Team 1 always won more games than Team 3.

D Team 2 won more games each year than in the previous year.

M10300

43. The table below shows the number of real estate transactions by type for a city.

Real Estate Transactions

Type of Property Sold	Number of Sales
Single-Family Residence	157
Condo/Townhouse	17
Mobile Home	6
Multi-Family	2
Commercial	15
Land	255
Total	**452**

Based on the information in the table, which statement is true?

A More than half of the sales were single-family residences.

B More sales occurred for land than in all other areas combined.

C The number of condo/townhouse sales was more than 10% of the total sales.

D The number of mobile home and multi-family sales combined was twice the number of commercial sales.

M21303

44. To get home from work, Curtis must get on one of the three highways that leave the city. He then has a choice of four different roads that lead to his house. In the diagram below, each letter represents a highway, and each number represents a road.

Road	Highway A	Highway B	Highway C
1	A 1	B 1	C 1
2	A 2	B 2	C 2
3	A 3	B 3	C 3
4	A 4	B 4	C 4

If Curtis randomly chooses a route to travel home, what is the probability that he will travel Highway B and Road 4?

A $\frac{1}{16}$

B $\frac{1}{12}$

C $\frac{1}{4}$

D $\frac{1}{3}$

M02512

45. The table below shows all of the possible outcomes when flipping three fair coins at the same time.

First Coin	Second Coin	Third Coin
H	H	H
H	H	T
H	T	H
H	T	T
T	H	H
T	H	T
T	T	H
T	T	T

Which of the following statements must be true?

A The probability that exactly two coins have the same outcome is $\frac{1}{2}$.

B The probability of getting exactly one tail is higher than getting exactly two tails.

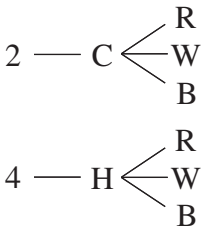
C The probability of getting at least one head is higher than the probability of getting at least one tail.

D The probability that all of the coins will land on heads is the same as the probability that all of the coins will land on tails.

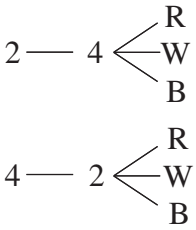
M13243

46. Carmen wants to buy a new car. Her choices are a 2-door or a 4-door, a convertible top or a hard top, and red, white, or black. Which of the following tree diagrams represents all the possible choices for the car?

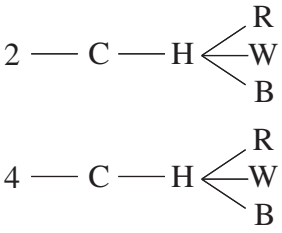
A



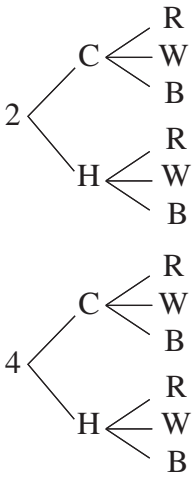
B



C



D



M00406

Statistics, Data Analysis, and Probability

47. A restaurant is advertising 3-item combination specials that must include a main dish, a vegetable, and a drink.

Lunch Specials

Main Dish	*Vegetable*	*Drink*
Chicken	Broccoli	Water
Beef	Carrots	Soft drink
	Peas	Milk
	Corn	

How many 3-item combinations include a soft drink and corn?

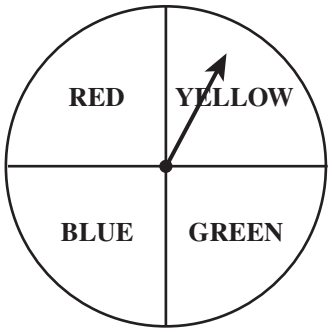
A 2
B 3
C 4
D 8

M13738

48. A bucket contains 3 bottles of apple juice, 2 bottles of orange juice, 6 bottles of tomato juice, and 8 bottles of water. If Kira randomly selects a bottle, what is the probability that she will select a drink other than water?

A $\frac{3}{4}$
B $\frac{11}{19}$
C $\frac{8}{19}$
D $\frac{1}{4}$

M11379



49. The spinner shown above is fair. What is the probability that the spinner will NOT stop on red if you spin it one time?

A $\frac{1}{4}$
B $\frac{1}{3}$
C $\frac{3}{4}$
D $\frac{4}{3}$

M00094

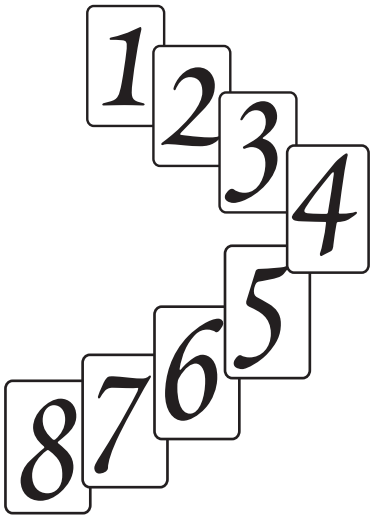
50. Fran has 16 CDs in a box: 6 country, 6 rock, 2 dance, and 2 classical. If she takes out one CD without looking, what is the probability that she will pick a rock or country CD?

A 25%
B 50%
C 75%
D 100%

M12305

Statistics, Data Analysis, and Probability

51. These 8 cards are placed face down and shuffled.



If Beatrice turns over only one card, what is the probability she will get a card with a number less than 4?

A $\frac{1}{4}$

B $\frac{3}{8}$

C $\frac{1}{2}$

D $\frac{5}{8}$

M25304

52. Mr. Gulati is holding five cards numbered 1 through 5. He has asked five students to each randomly pick a card to see who goes first in a game. Whoever picks the card numbered 5 goes first. Juanita picks first, gets the card numbered 4, and keeps the card. What is the probability that Yoko will get the card numbered 5 if she picks second?

A $\frac{1}{2}$

B $\frac{1}{3}$

C $\frac{1}{4}$

D $\frac{1}{5}$

M02145

53. A bag contained four green balls, three red balls, and two purple balls. Jason removed one purple ball from the bag and did NOT put the ball back in the bag. He then randomly removed another ball from the bag. What is the probability that the second ball Jason removed was purple?

A $\frac{1}{36}$

B $\frac{1}{9}$

C $\frac{1}{8}$

D $\frac{2}{9}$

M03097

54. Anna has the letter tiles below in a bag.

S	T	A	T	I	S	T	I	C	S

She reached in the bag and pulled out an S. She then put the tile back in the bag. If Anna randomly selects a tile from the bag, what is the probability she will select an S again?

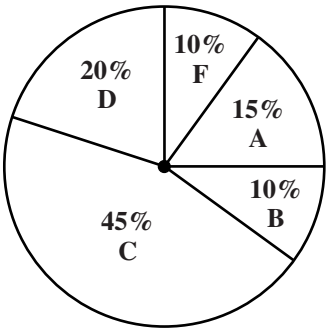
A $\frac{1}{5}$

B $\frac{2}{9}$

C $\frac{3}{10}$

D $\frac{1}{3}$

M25311



55. The circle graph shown above represents the distribution of the grades of 40 students in a certain geometry class. How many students received As or Bs?

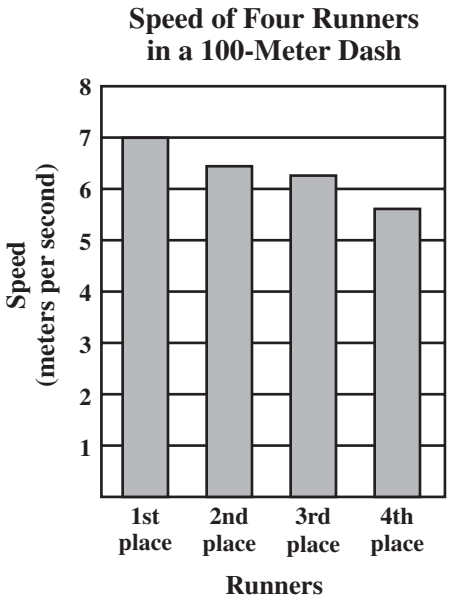
A 6

B 10

C 15

D 20

M00300



56. Based on the bar graph shown above, which of the following conclusions is true?

A Everyone ran faster than 6 meters per second.

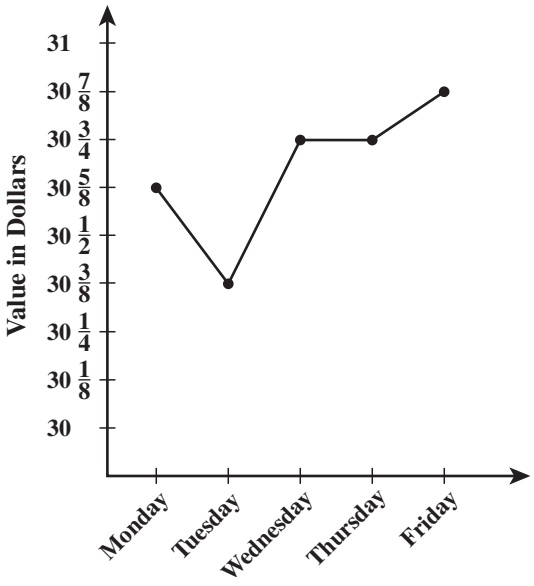
B The best possible rate for the 100-meter dash is 5 meters per second.

C The first-place runner was four times as fast as the fourth-place runner.

D The second-place and third-place runners were closest in time to one another.

M00279

57. The graph below represents the closing price of a share of a certain stock for each day of a week.



Which day had the greatest increase in the value of this stock over that of the previous day?

A Tuesday

B Wednesday

C Thursday

D Friday

M00295

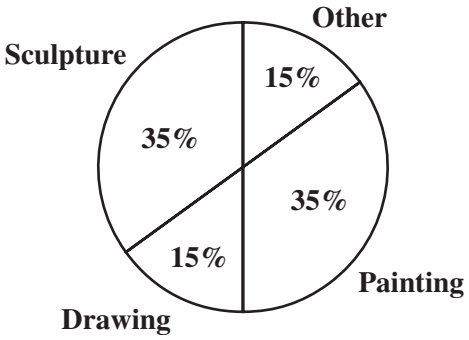
58. The students at a high school were asked to name their favorite type of art. The table below shows the results of the survey.

Art Survey

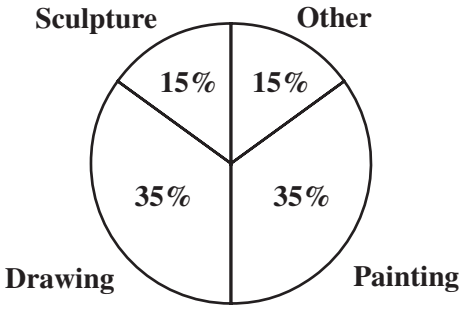
Type of Art	Number of Students
Painting	714
Drawing	709
Sculpture	296
Other	305

Which circle graph BEST shows these data?

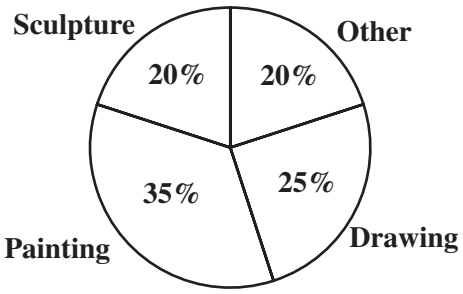
A



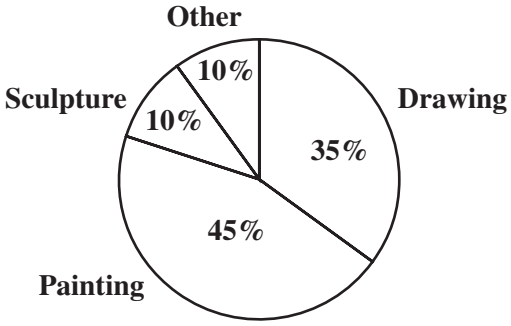
B



C

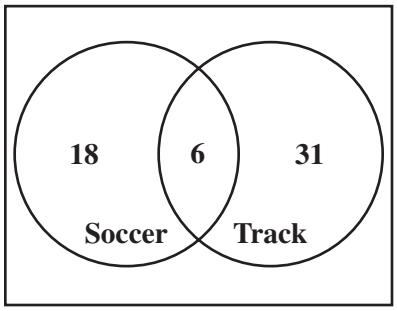


D



M13053

59. The Venn diagram below shows the number of girls on the soccer and track teams at a high school.



How many girls are on both the soccer and track teams?

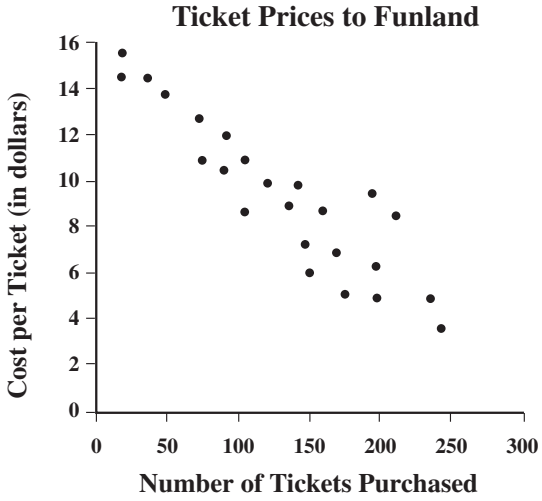
A 6

B 12

C 49

D 55

M21162



60. The cost of a ticket to Funland varies according to the season. Which of the following conclusions about the number of tickets purchased and the cost per ticket is BEST supported by the scatterplot above?

A The cost per ticket increases as the number of tickets purchased increases.

B The cost per ticket is unchanged as the number of tickets purchased increases.

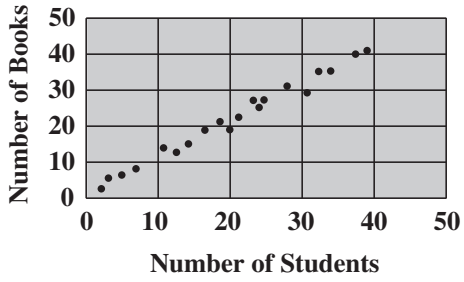
C The cost per ticket decreases as the number of tickets purchased increases.

D There is no relationship between the cost per ticket and the number of tickets purchased.

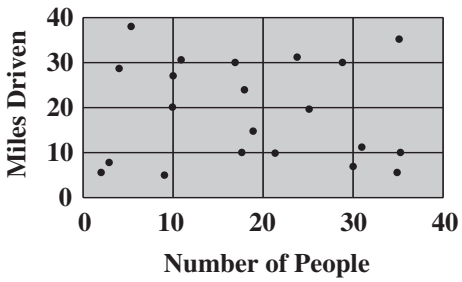
M02208

61. Which scatterplot shows a negative correlation?

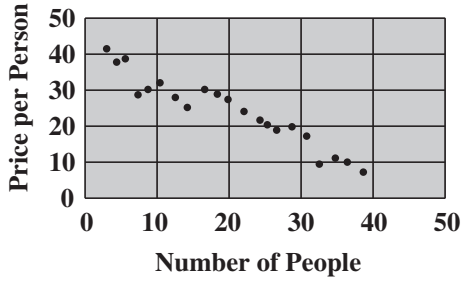
A



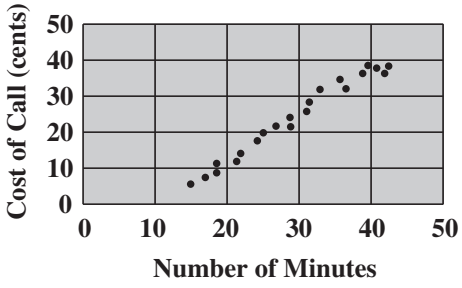
C



B

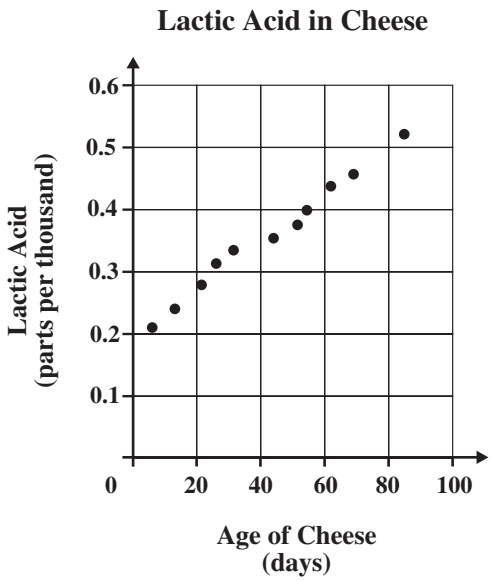


D



M02546

62. The scatterplot below shows the time cheese has been aging and the amount of lactic acid present in the cheese.



Which statement is MOST strongly supported by the scatterplot?

A The longer cheese ages, the more lactic acid is present.

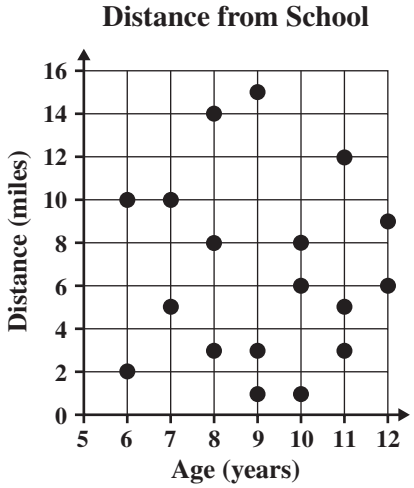
B The longer cheese ages, the less lactic acid is present.

C The amount of lactic acid present remains constant as cheese ages.

D No relationship exists between the time cheese ages and the amount of lactic acid present.

M22077

63. The scatterplot below shows the ages of some children and the distance each child lives from school.



Which statement BEST describes the relationship between age and distance from school?

A As age increases, the distance from school increases.

B As age increases, the distance from school decreases.

C As age increases, the distance from school remains constant.

D There is no relationship between age and distance from school.

M10565

Statistics, Data Analysis, and Probability

Question Number	Correct Answer	Standard	School Year of Exam
36	B	6PS1.1	2002-2003
37	C	6PS1.1	2001-2002
38	C	6PS1.1	2000-2001
39	C	6PS1.1	2003-2004
40	D	6PS2.5	2002-2003
41	C	6PS2.5	2001-2002
42	D	6PS2.5	2003-2004
43	B	6PS2.5	2006-2007
44	B	6PS3.1	2001-2002
45	D	6PS3.1	2003-2004
46	D	6PS3.1	2004-2005
47	A	6PS3.1	2006-2007
48	B	6PS3.3	2002-2003
49	C	6PS3.3	2000-2001
50	C	6PS3.3	2004-2005
51	B	6PS3.3	2006-2007
52	C	6PS3.5	2001-2002
53	C	6PS3.5	2001-2002
54	C	6PS3.5	2005-2006
55	B	7PS1.1	2002-2003
56	D	7PS1.1	2001-2002
57	B	7PS1.1	2000-2001
58	B	7PS1.1	2004-2005
59	A	7PS1.1	2005-2006
60	C	7PS1.2	2000-2001
61	B	7PS1.2	2001-2002
62	A	7PS1.2	2003-2004
63	D	7PS1.2	2006-2007

ALGEBRA AND FUNCTIONS

The following ten California mathematics academic content standards from the Algebra and Functions strand are assessed on the CAHSEE by 17 test questions and are represented in this booklet by 36 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 7 — ALGEBRA AND FUNCTIONS	
Standard Set 1.0	**Students express quantitative relationships by using algebraic terminology, expressions, equations, inequalities, and graphs:**
1.1	Use variables and appropriate operations to write an expression, an equation, an inequality, or a system of equations or inequalities that represents a verbal description (e.g., three less than a number, half as large as area A).
1.2	Use the correct order of operations to evaluate algebraic expressions such as $3(2x + 5)^2$.
1.5	Represent quantitative relationships graphically and interpret the meaning of a specific part of a graph in the situation represented by the graph.
Standard Set 2.0	**Students interpret and evaluate expressions involving integer powers and simple roots:**
2.1	Interpret positive whole-number powers as repeated multiplication and negative whole-number powers as repeated division or multiplication by the multiplicative inverse. Simplify and evaluate expressions that include exponents.
2.2	Multiply and divide monomials; extend the process of taking powers and extracting roots to monomials when the latter results in a monomial with an integer exponent.
Standard Set 3.0	**Students graph and interpret linear and some nonlinear functions:**
3.1	Graph functions of the form $y = nx^2$ and $y = nx^3$ and use in solving problems.
3.3	Graph linear functions, noting that the vertical change (change in *y*-value) per unit of horizontal change (change in *x*-value) is always the same and know that the ratio ("rise over run") is called the slope of a graph.
3.4	Plot the values of quantities whose ratios are always the same (e.g., cost to the number of an item, feet to inches, circumference to diameter of a circle). Fit a line to the plot and understand that the slope of the line equals the quantities.
Standard Set 4.0	**Students solve simple linear equations and inequalities over the rational numbers:**
4.1	Solve two-step linear equations and inequalities in one variable over the rational numbers, interpret the solution or solutions in the context from which they arose, and verify the reasonableness of the results.
4.2	Solve multistep problems involving rate, average speed, distance, and time or a direct variation.

Algebra and Functions

64. Which of the following inequalities represents the statement, "A number, x, decreased by 13 is less than or equal to 39"?

A $13 - x \geq 39$

B $13 - x \leq 39$

C $x - 13 \leq 39$

D $x - 13 < 39$

M03049

65. A shopkeeper has x kilograms of tea in stock. He sells 15 kilograms and then receives a new shipment weighing $2y$ kilograms. Which expression represents the weight of the tea he now has?

A $x - 15 - 2y$

B $x + 15 + 2y$

C $x + 15 - 2y$

D $x - 15 + 2y$

M00110

66. Divide a number by 5 and add 4 to the result. The answer is 9.

Which of the following equations matches these statements?

A $4 = 9 + \frac{n}{5}$

B $\frac{n}{5} + 4 = 9$

C $\frac{5}{n} = 4$

D $\frac{n+4}{5} = 9$

M00050

67. At a local bookstore, books that normally cost b dollars are on sale for 10 dollars off the normal price. How many dollars does it cost to buy 3 books on sale?

A $3b - 10$

B $3b + 10$

C $3(b - 10)$

D $3(b + 10)$

M10375

68. If $n = 2$ and $x = \frac{1}{2}$, then $n(4 - x) =$

A 1

B 3

C 7

D 10

M00034

69. If $h = 3$ and $k = 4$, then $\frac{hk + 4}{2} - 2 =$

A 6

B 7

C 8

D 10

M00052

70. What is the value of $(3 + 5^2) \div 4 - (x + 1)$ when $x = 7$?

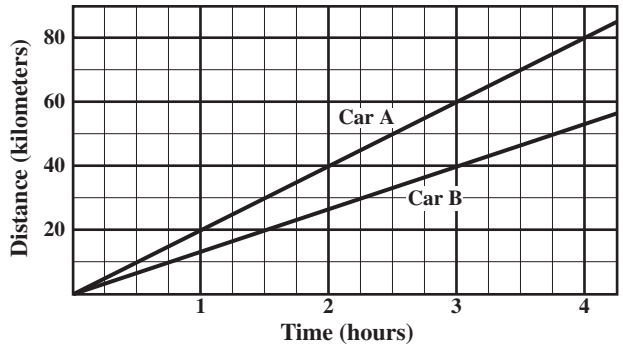
A -7

B -1

C 8

D 10

M12963



71. After three hours of travel, Car A is about how many kilometers ahead of Car B?

A 2

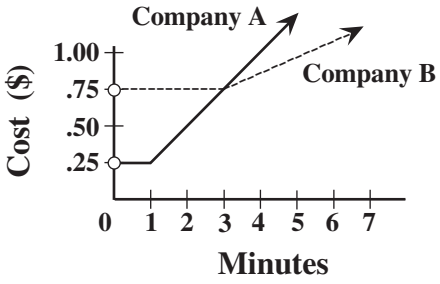
B 10

C 20

D 25

M00066

72. The cost of a long distance call charged by each of two telephone companies is shown on the graph below.



Company A is less expensive than Company B for—

A all calls.

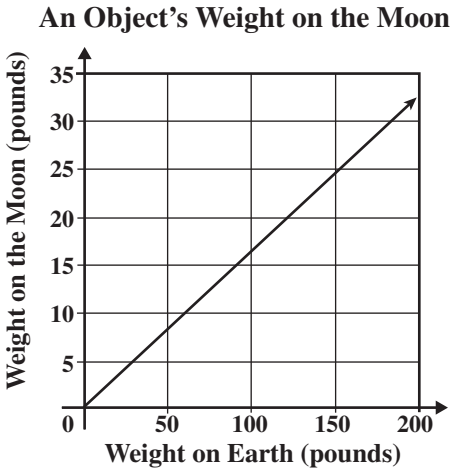
B 3 minute calls only.

C calls less than 3 minutes.

D calls longer than 3 minutes.

M02840

73. The graph below compares the weight of an object on Earth to its weight on the Moon.



What is the approximate weight on the Moon of an astronaut who weighs 120 pounds on Earth?

A 15 pounds

B 20 pounds

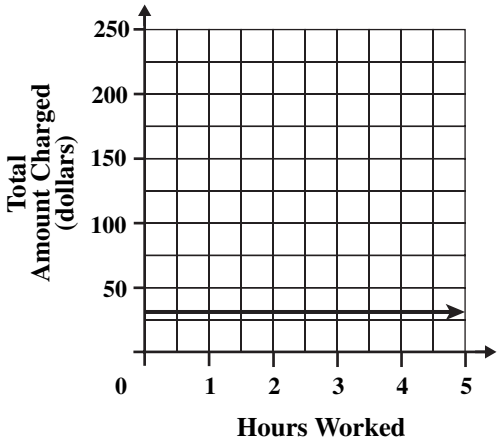
C 25 pounds

D 30 pounds

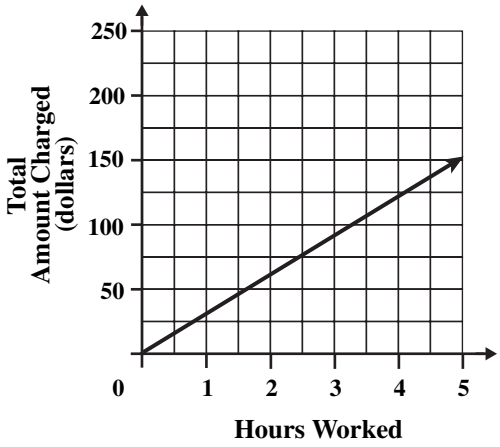
M10668

74. Amy works as a computer consultant. She charges $30 per hour for her work. Which graph shows the relationship between the number of hours Amy works and the amount of money she charges for her work?

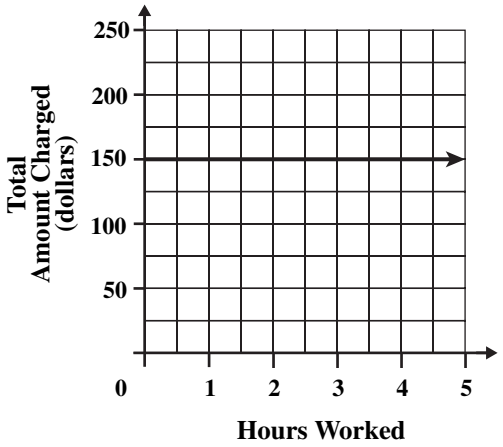
A



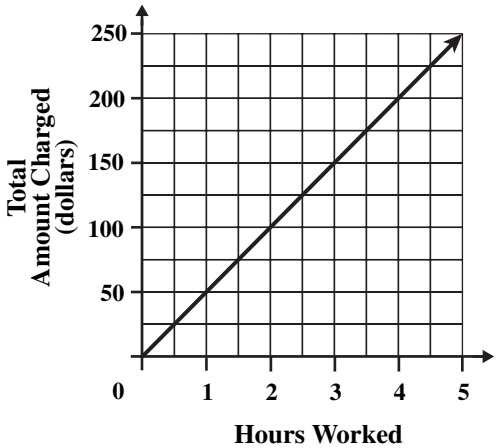
C



B



D



M21619

Algebra and Functions

75. $x^3y^3 =$

A $9xy$

B $(xy)^6$

C $3xy$

D $xxxyyy$

M02879

76. What does x^5 equal when $x = -2$?

A -32

B -10

C $-\frac{1}{32}$

D 32

M12857

77. Which of the following is equivalent to $(6x - 2)(6x - 2)(6x + 2)$?

A $(6x - 2)^3$

B $(6x + 2)^3$

C $2(6x - 2)(6x + 2)$

D $(6x - 2)^2(6x + 2)$

M12845

78. $\sqrt{4x^4} =$

A 2

B $2x$

C $4x$

D $2x^2$

M03067

79. Simplify the expression shown below.

$$\left(6a^4bc\right)\left(7ab^3c\right)$$

A $13a^4b^3c$

B $13a^5b^4c^2$

C $42a^4b^3c$

D $42a^5b^4c^2$

M02109

80. Which expression is equivalent to $7a^2b \cdot 7bc^2$?

A $14a^2b^2c^2$

B $49a^2bc^2$

C $49a^2b^2c^2$

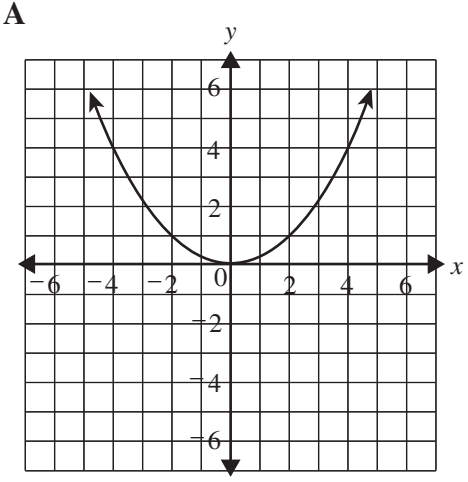
D $343a^2b^2c^2$

M12872

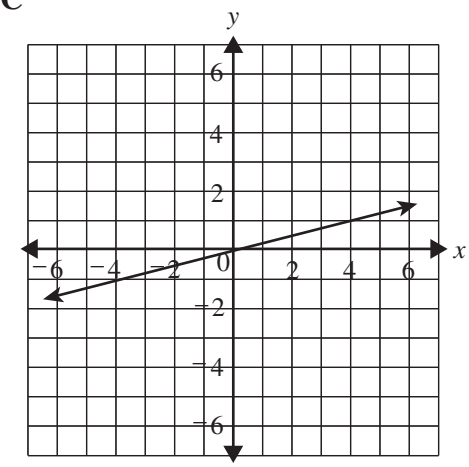
Algebra and Functions

81. Which of the following is the graph of $y = \frac{1}{4}x^2$?

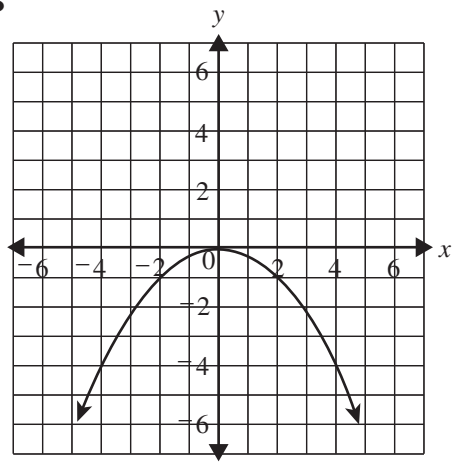
A



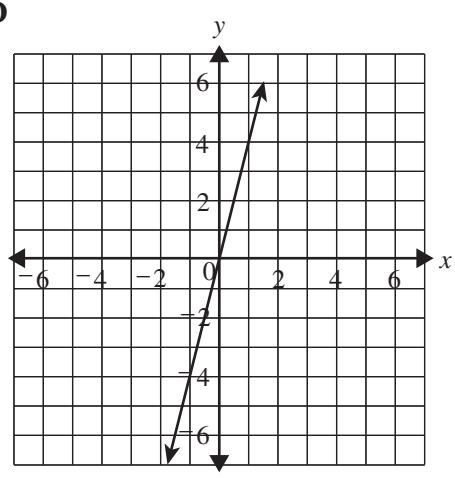
C



B



D

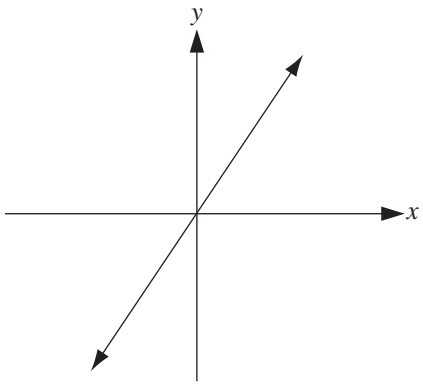


M03210

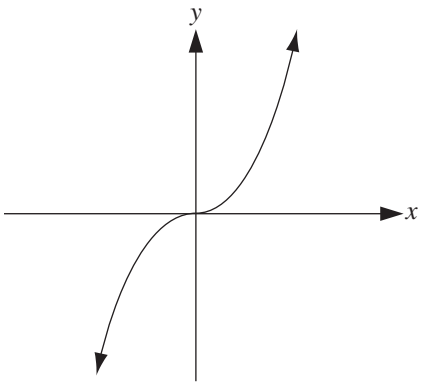
Algebra and Functions

82. Which of the following could be the graph of $y = x^3$?

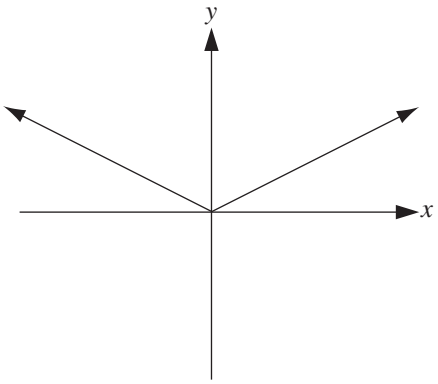
A



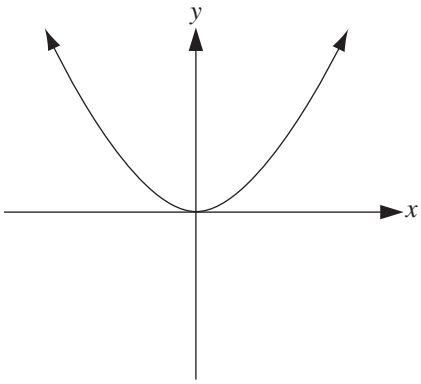
C



B



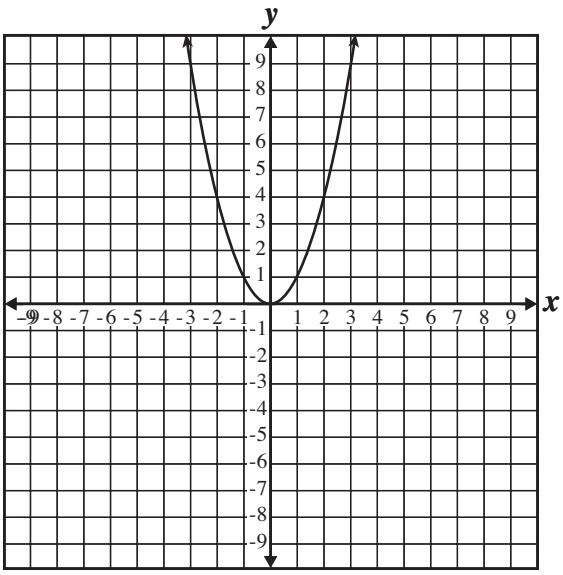
D



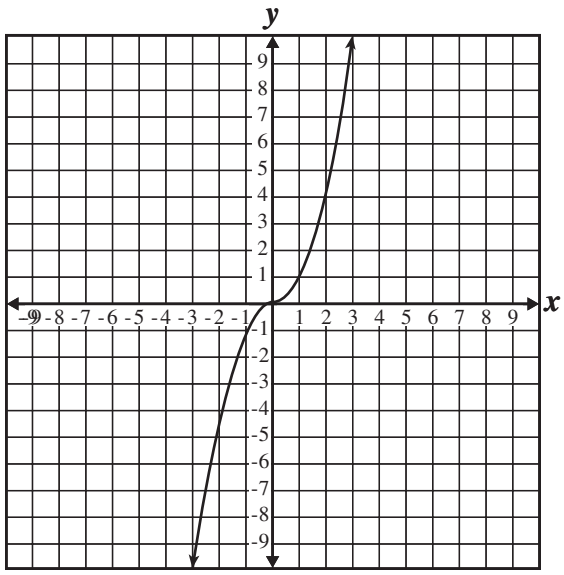
M02200

83. Which graph represents the function $y = -x^2$?

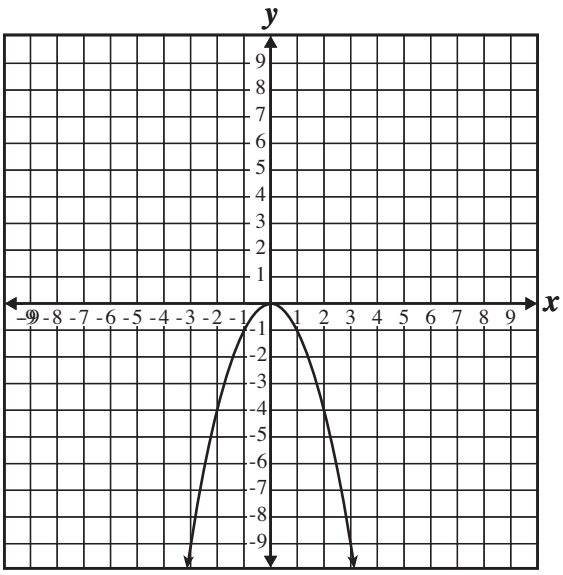
A



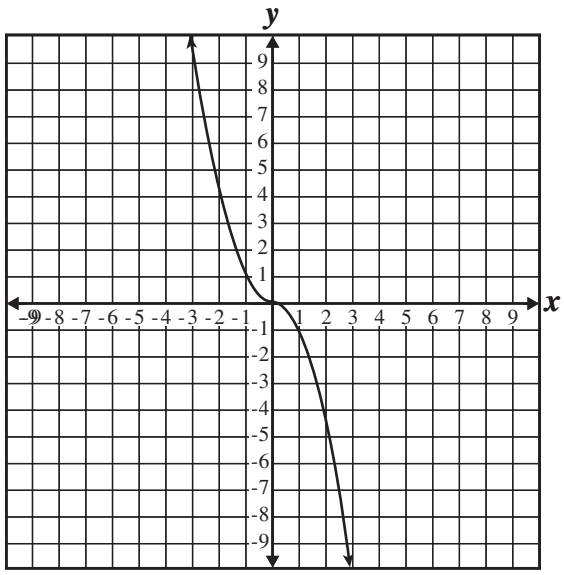
C



B



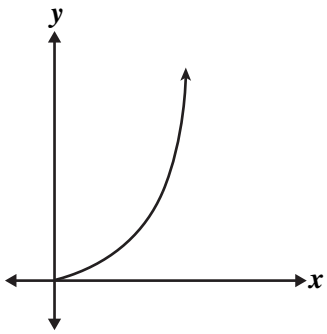
D



M13623

Algebra and Functions

84. Which equation BEST represents the part of the graph shown below?



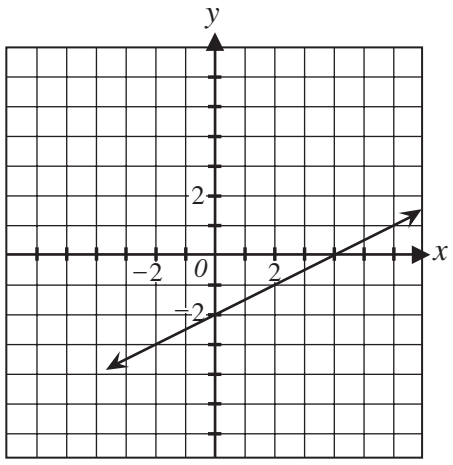
A $y = 1.75x$

B $y = 1.75x^2$

C $y = -1.75x$

D $y = -1.75x^2$

M10760



85. What is the slope of the line shown in the graph above?

A -2

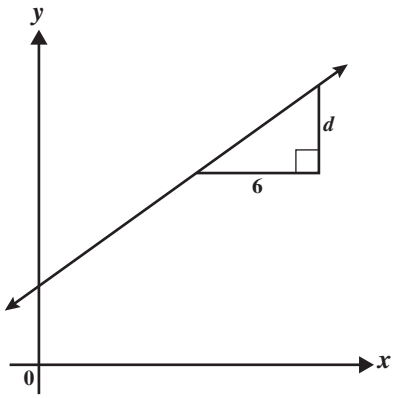
B $-\frac{1}{2}$

C $\frac{1}{2}$

D 2

M02556

86. The slope of the line shown below is $\frac{2}{3}$.



What is the value of *d*?

A 3

B 4

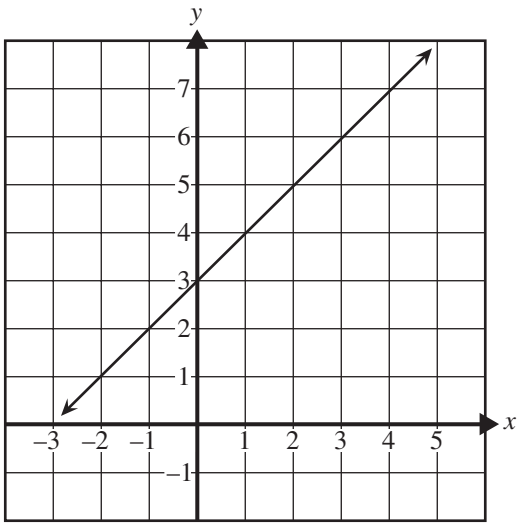
C 6

D 9

M02078

Algebra and Functions

87. What is the equation of the graph shown below?



A $y = x - 1$

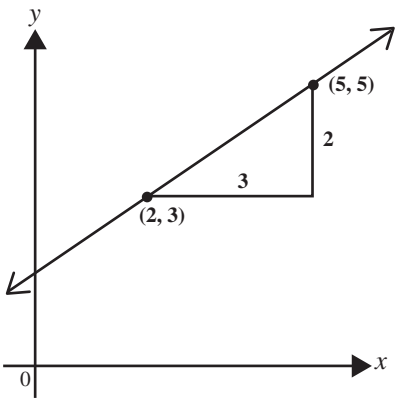
B $y = x + 1$

C $y = x + 3$

D $y = x - 3$

M02035

88. What is the slope of the line below?



A $-\frac{3}{2}$

B $-\frac{2}{3}$

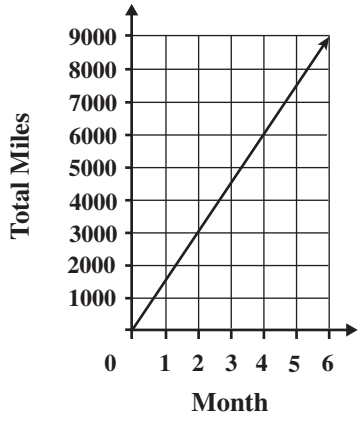
C $\frac{2}{3}$

D $\frac{3}{2}$

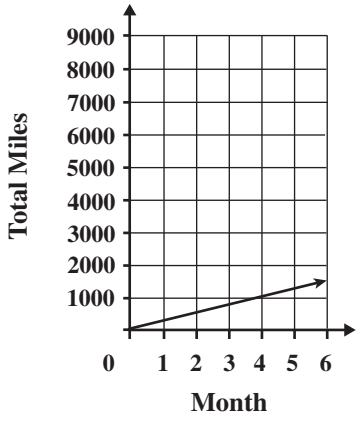
M02077

89. Mario drives 1500 miles every month. Which line plot correctly represents Mario's total miles driven over a period of six months?

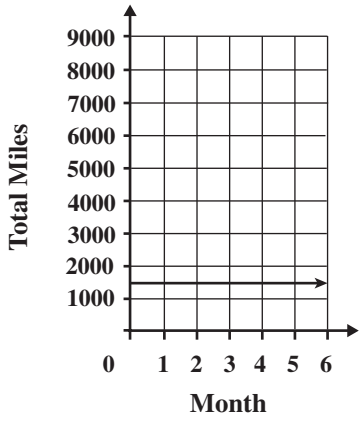
A



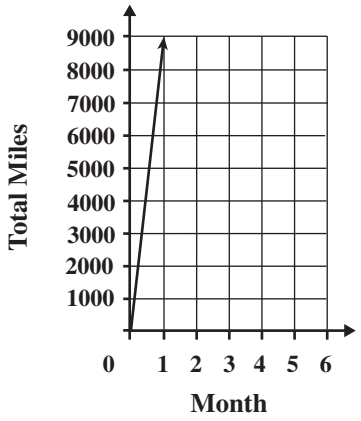
C



B

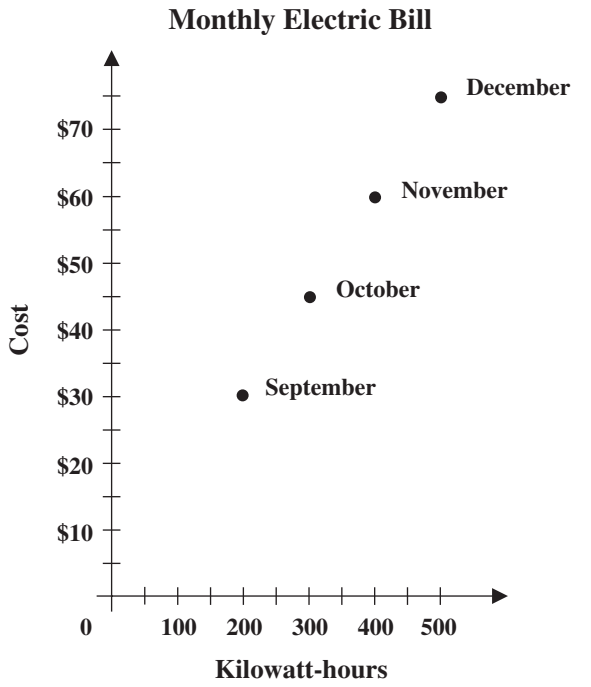


D



M11652

90. The graph below shows Francine's electric bill for 4 different months. What is the price per kilowatt-hour of Francine's electricity?



A $0.15

B $0.30

C $1.50

D $6.67

M02681

91. In the inequality $2x + \$10{,}000 \geq \$70{,}000$, x represents the salary of an employee in a school district. Which phrase most accurately describes the employee's salary?

A At least $30,000

B At most $30,000

C Less than $30,000

D More than $30,000

M02621

92. Solve for x.

$$2x - 3 = 7$$

A -5

B -2

C 2

D 5

M02771

93. Solve for n.

$$2n + 3 < 17$$

A $n < 2$

B $n < 3$

C $n < 5$

D $n < 7$

M02040

94. The owner of an apple orchard ships apples in boxes that weigh 2 kilograms (kg) when empty. The average apple weighs 0.25 kg, and the total weight of a box filled with apples is 12 kg. How many apples are packed in each box?

A 14

B 40

C 48

D 56

M10327

Algebra and Functions

95. Brad bought a $6 binder and several packs of paper that cost $0.60 each. If his total was $13.20, how many packs of paper did Brad buy?

A 2
B 6
C 12
D 22

M12223

96. Stephanie is reading a 456-page book. During the past 7 days she has read 168 pages. If she continues reading at the same rate, how many more days will it take her to complete the book?

A 12
B 14
C 19
D 24

M00380

97. Robert's toy car travels at 40 centimeters per second (cm/sec) at high speed and 15 cm/sec at low speed. If the car travels for 15 seconds at high speed and then 30 seconds at low speed, what distance would the car have traveled?

A 1050 cm
B 1200 cm
C 1425 cm
D 2475 cm

M10748

98. Sara can ride her bicycle 3 miles in 15 minutes. At this rate, how many miles can she ride her bicycle in 50 minutes?

A 5
B 10
C 15
D 20

M12177

99. Lisa typed a 1000-word essay at an average rate of 20 words per minute. If she started typing at 6:20 p.m. and did not take any breaks, at what time did Lisa finish typing the essay?

A 6:40 p.m.
B 6:50 p.m.
C 7:00 p.m.
D 7:10 p.m.

M13652

Algebra and Functions

Question Number	Correct Answer	Standard	School Year of Exam
64	C	7AF1.1	2001-2002
65	D	7AF1.1	2001-2002
66	B	7AF1.1	2000-2001
67	C	7AF1.1	2005-2006
68	C	7AF1.2	2002-2003
69	A	7AF1.2	2000-2001
70	B	7AF1.2	2006-2007
71	C	7AF1.5	2001-2002
72	C	7AF1.5	2000-2001
73	B	7AF1.5	2004-2005
74	C	7AF1.5	2005-2006
75	D	7AF2.1	2001-2002
76	A	7AF2.1	2003-2004
77	D	7AF2.1	2004-2005
78	D	7AF2.2	2001-2002
79	D	7AF2.2	2000-2001
80	C	7AF2.2	2004-2005
81	A	7AF3.1	2002-2003
82	C	7AF3.1	2000-2001
83	B	7AF3.1	2006-2007
84	B	7AF3.1	2005-2006
85	C	7AF3.3	2001-2002
86	B	7AF3.3	2001-2002
87	C	7AF3.3	2000-2001
88	C	7AF3.3	2000-2001
89	A	7AF3.4	2006-2007
90	A	7AF3.4	2003-2004
91	A	7AF4.1	2001-2002
92	D	7AF4.1	2001-2002
93	D	7AF4.1	2000-2001
94	B	7AF4.1	2003-2004
95	C	7AF4.1	2005-2006
96	A	7AF4.2	2001-2002
97	A	7AF4.2	2003-2004
98	B	7AF4.2	2004-2005
99	D	7AF4.2	2006-2007

MEASUREMENT AND GEOMETRY

The following ten California mathematics academic content standards from the Measurement and Geometry strand are assessed on the CAHSEE by 17 test questions and are represented in this booklet by 41 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

GRADE 7 — MEASUREMENT AND GEOMETRY	
Standard Set 1.0	**Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems:**
1.1	Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).
1.2	Construct and read drawings and models made to scale.
1.3	Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the solutions; and use dimensional analysis to check the reasonableness of the answer.
Standard Set 2.0	**Students compute the perimeter, area, and volume of common geometric objects and use the results to find measures of less common objects. They know how perimeter, area and volume are affected by changes of scale:**
2.1	Use formulas routinely for finding the perimeter and area of basic two-dimensional figures and the surface area and volume of basic three-dimensional figures, including rectangles, parallelograms, trapezoids, squares, triangles, circles, prisms, and cylinders.
2.2	Estimate and compute the area of more complex or irregular two- and three-dimensional figures by breaking the figures down into more basic geometric objects.
2.3	Compute the length of the perimeter, the surface area of the faces, and the volume of a three-dimensional object built from rectangular solids. Understand that when the lengths of all dimensions are multiplied by a scale factor, the surface area is multiplied by the square of the scale factor and volume is multiplied by the cube of the scale factor.
2.4	Relate the changes in measurement with a change of scale to the units used (e.g., square inches, cubic feet) and to conversions between units (1 square foot = 144 square inches or [1 ft^2] = [144 in^2], 1 cubic inch is approximately 16.38 cubic centimeters or [1 in^3] = [16.38 cm^3]).

Standard Set 3.0	**Students know the Pythagorean theorem and deepen their understanding of plane and solid geometric shapes by constructing figures that meet given conditions and by identifying attributes of figures:**
3.2	Understand and use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their image under translations and reflections.
3.3	Know and understand the Pythagorean theorem and its converse and use it to find the length of the missing side of a right triangle and the lengths of other line segments and, in some situations, empirically verify the Pythagorean theorem by direct measurement.
3.4	Demonstrate an understanding of conditions that indicate two geometrical figures are congruent and what congruence means about the relationships between the sides and angles of the two figures.

100. One millimeter is—

A $\frac{1}{1000}$ of a meter.

B $\frac{1}{100}$ of a meter.

C 100 meters.

D 1000 meters.

M00276

101. A boy is two meters tall. About how tall is the boy in feet (ft) and inches (in.)? (1 meter $\approx$ 39 inches)

A 5 ft 0 in.

B 5 ft 6 in.

C 6 ft 0 in.

D 6 ft 6 in.

M02044

102. Juanita exercised for one hour. How many seconds did Juanita exercise?

A 60

B 120

C 360

D 3,600

M03074

103. If Jill is driving at 65 miles per hour, what is her approximate speed in kilometers per hour? (1 mile $\approx$ 1.6 kilometers)

A 16

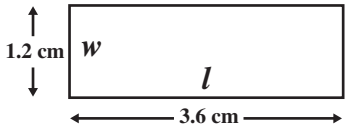
B 41

C 104

D 173

M13251

104. The actual width (w) of a rectangle is 18 centimeters (cm). Use the scale drawing of the rectangle to find the actual length (l).



A 6 cm

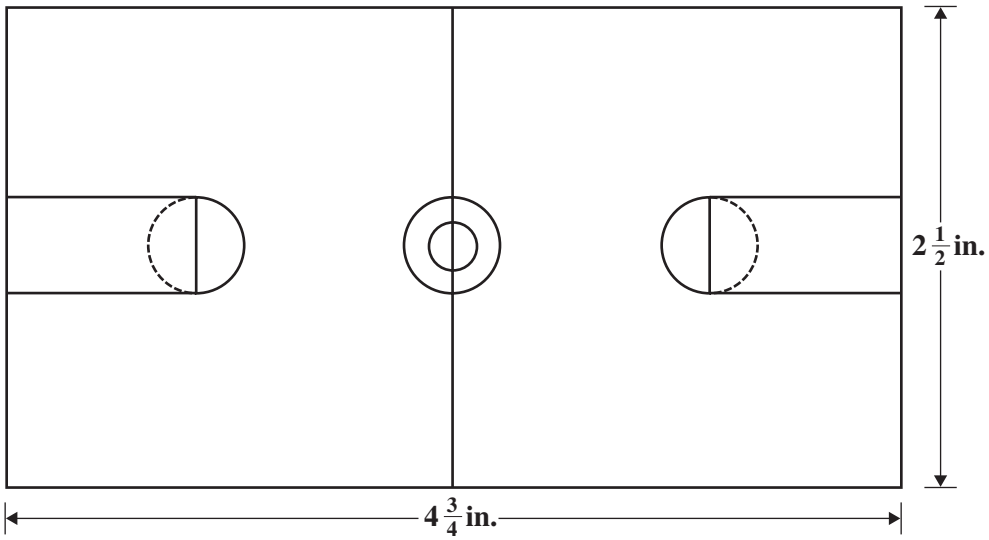
B 24 cm

C 36 cm

D 54 cm

M02087

105. The scale drawing of the basketball court shown below is drawn using a scale of 1 inch (in.) = 24 feet (ft).



What is the length, in feet, of the basketball court?

A 90 ft

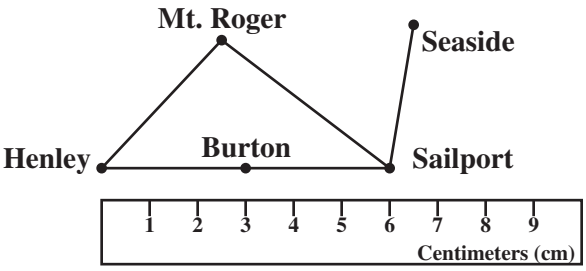
B 104 ft

C 114 ft

D 120 ft

M02233

106. Javier is using a ruler and a map to measure the distance from Henley to Sailport.



The actual distance from Henley to Sailport is 120 kilometers (km). What scale was used to create the map?

A 1 cm = 6 km

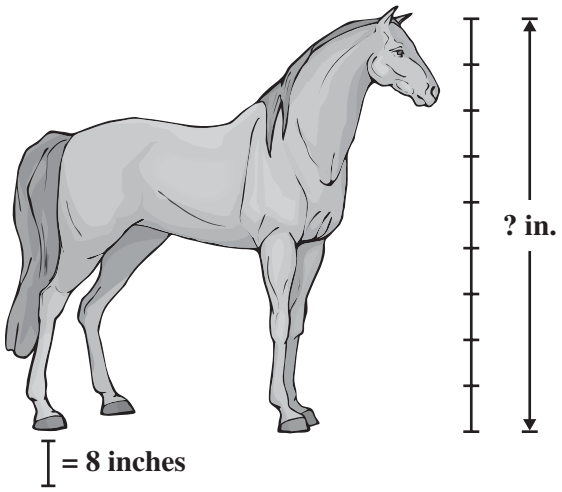
B 1 cm = 12 km

C 1 cm = 15 km

D 1 cm = 20 km

M21169

107. A scale drawing of a horse is shown below.



What is the actual height of the horse, in inches (in.), from the hoof to the top of the head?

A 56

B 64

C 72

D 80

M32040

108. Sixty miles per hour is the same rate as which of the following?

A 1 mile per minute

B 1 mile per second

C 6 miles per minute

D 360 miles per second

M02473

109. Beverly ran six miles at the speed of four miles per hour. How long did it take her to run that distance?

A $\frac{2}{3}$ hr

B $1\frac{1}{2}$ hrs

C 4 hrs

D 6 hrs

M02041

110. Marcus can type about 42 words per minute. If he types at this rate for 30 minutes without stopping, about how many words will he type?

A 1260

B 2100

C 2520

D 4200

M21029

111. A landscaper estimates that landscaping a new park will take 1 person 48 hours. If 4 people work on the job and they each work 6-hour days, how many days are needed to complete the job?

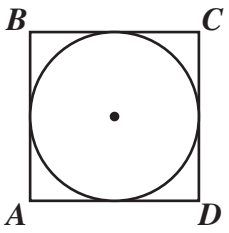
A 2

B 4

C 6

D 8

M11541



112. In the figure above, the radius of the inscribed circle is 6 inches (in.). What is the perimeter of square *ABCD* ?

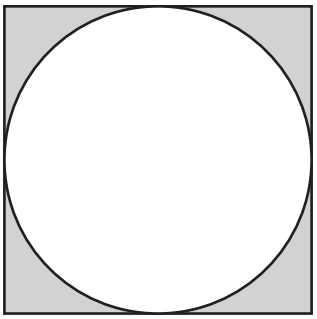
A 12π in.

B 36π in.

C 24 in.

D 48 in.

M02236



10 feet

113. The largest possible circle is to be cut from a 10-foot square board. What will be the approximate area, in square feet, of the remaining board (shaded region)? ($A = \pi r^2$ and $\pi \approx 3.14$)

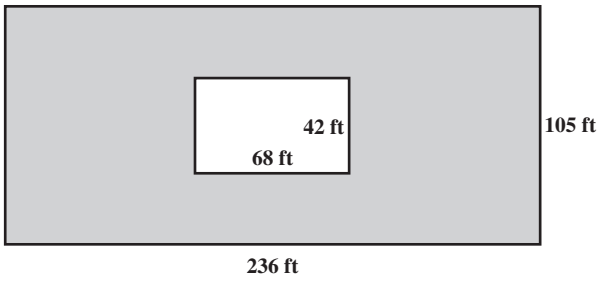
A 20

B 30

C 50

D 80

M00404



115. A rectangular pool 42 feet by 68 feet is on a rectangular lot 105 feet by 236 feet. The rest of the lot is grass. Approximately how many square feet is grass?

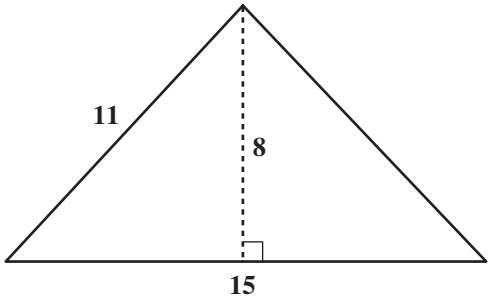
A 2,100

B 2,800

C 21,000

D 28,000

M00311



114. What is the area of the triangle shown above?

A 44 square units

B 60 square units

C 88 square units

D 120 square units

M00101

116. What is the volume of the shoebox shown above in cubic inches ($in.^3$)?

A 29

B 75

C 510

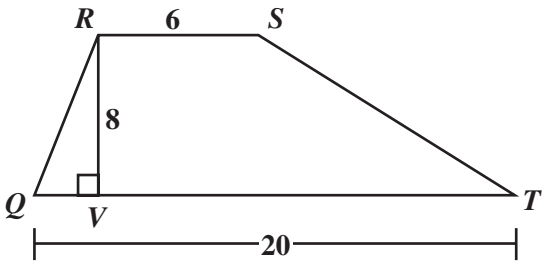
D 675

M02629

Measurement and Geometry

117. What is the area, in square units, of trapezoid *QRST* shown below?

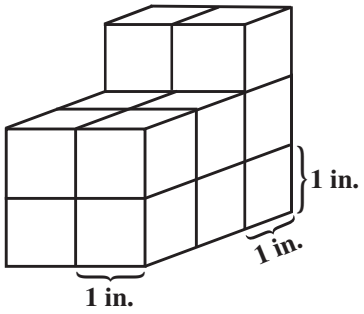
$\left[A = \frac{1}{2}h(b_1 + b_2)\right]$



A 68
B 104
C 208
D 960

M12087

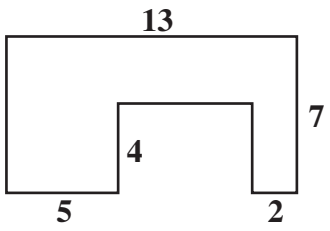
118. One-inch cubes are stacked as shown in the drawing below.



What is the total surface area?

A 19 in.^{2}
B 29 in.^{2}
C 32 in.^{2}
D 38 in.^{2}

M02812

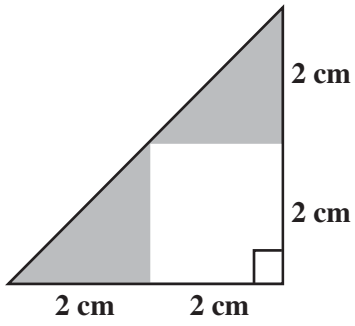


119. In the figure shown above, all the corners form right angles. What is the area of the figure in square units?

A 67
B 73
C 78
D 91

M00318

120. What is the area of the shaded region in the figure shown below?

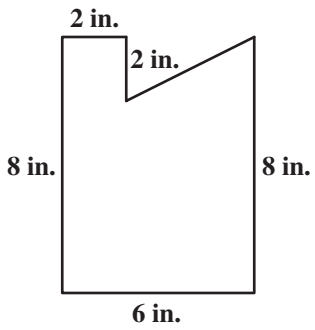


A 4 cm^2
B 6 cm^2
C 8 cm^2
D 16 cm^2

M02814

Measurement and Geometry

121. A right triangle is removed from a rectangle as shown in the figure below. Find the area of the remaining part of the rectangle.



A 40 in.^{2}

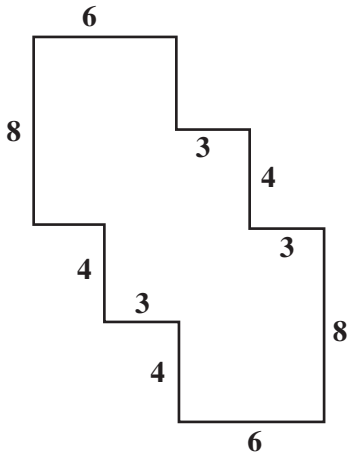
B 44 in.^{2}

C 48 in.^{2}

D 52 in.^{2}

M02093

122. In the figure below, every angle is a right angle.



What is the area, in square units, of the figure?

A 96

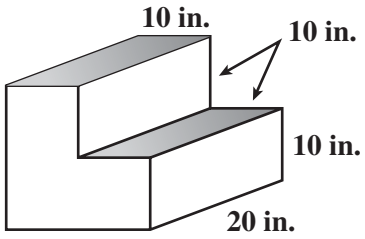
B 108

C 120

D 144

M10790

123. The short stairway shown below is made of solid concrete. The height and width of each step is 10 inches (in.). The length is 20 inches.



What is the volume, in cubic inches, of the concrete used to create this stairway?

A 3000

B 4000

C 6000

D 8000

M02990

124. Bonni has two similar rectangular boxes. The dimensions of box 1 are twice those of box 2. How many times greater is the volume of box 1 than the volume of box 2?

A 3

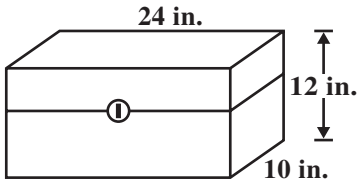
B 6

C 8

D 9

M21061

125. Gina is painting the rectangular tool chest shown in the diagram below.



If Gina paints only the outside of the tool chest, what is the total surface area, in square inches (in.^2), she will paint?

A 368

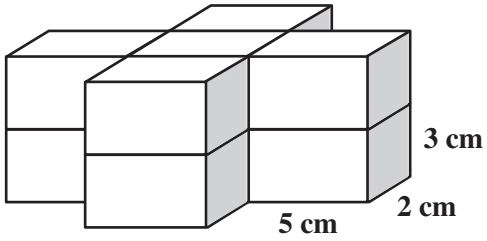
B 648

C 1296

D 2880

M20643

126. The object below is made of ten rectangular prisms, each with dimensions of 5 centimeters (cm) by 3 cm by 2 cm. What is the volume, in cubic centimeters, of the object?



A 100

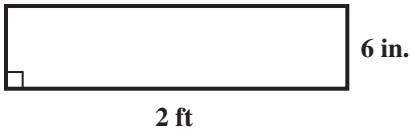
B 150

C 250

D 300

M30226

127. The width of the rectangle shown below is 6 inches (in.). The length is 2 feet (ft).



What is the area of the rectangle in square inches?

A 12

B 16

C 60

D 144

M03243

128. One cubic inch is approximately equal to 16.38 cubic centimeters. Approximately how many cubic centimeters are there in 3 cubic inches?

A 5.46

B 13.38

C 19.38

D 49.14

M02700

129. A rectangular field is 363 feet long and 240 feet wide. How many acres is the field? (1 acre = 43,560 square feet)

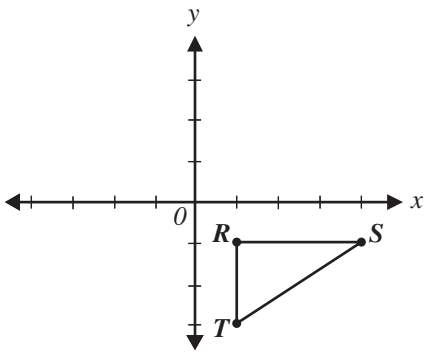
A 2

B 3

C 4

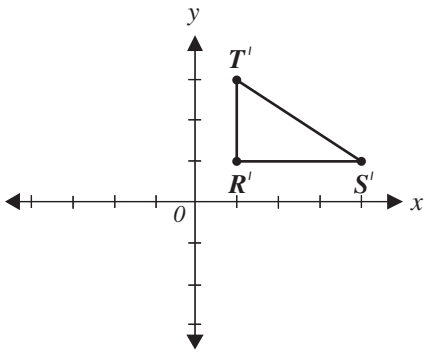
D 5

M13918

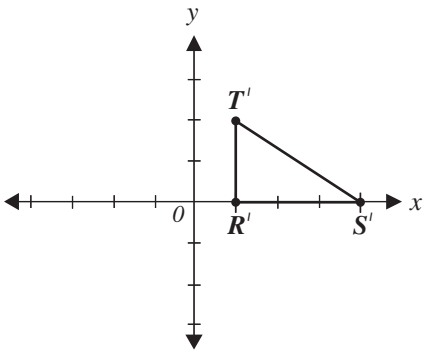


130. Which of the following triangles $R'S'T'$ is the image of triangle *RST* that results from reflecting triangle *RST* across the *y*-axis?

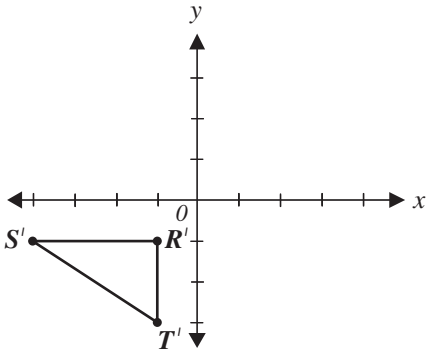
A



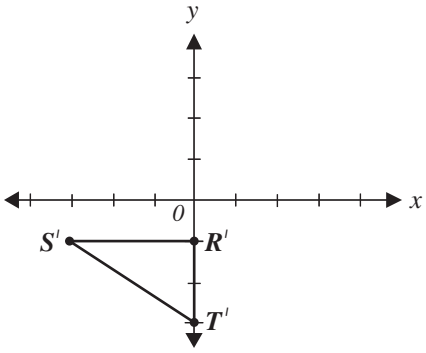
C



B



D



M02861

131. The points (1, 1), (2, 3), (4, 3), and (5, 1) are the vertices of a polygon. What type of polygon is formed by these points?

A Triangle

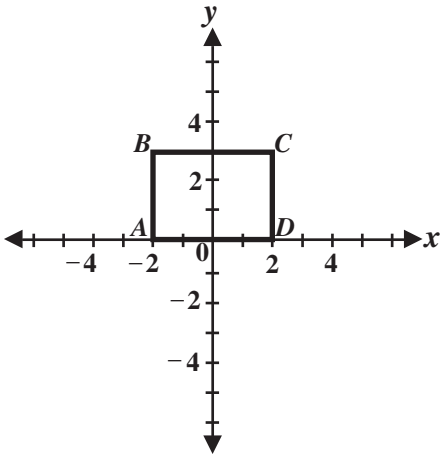
B Trapezoid

C Parallelogram

D Pentagon

M02718

132. The graph of rectangle *ABCD* is shown below.



What is the area, in square units, of rectangle *ABCD*?

A 6

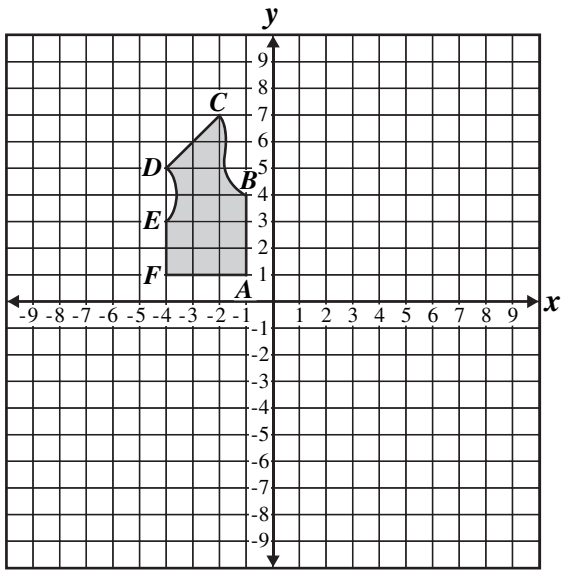
B 10

C 12

D 14

M03136

133. A clothing company created the following diagram for a vest.



To show the other side of the vest, the company will reflect the drawing across the *y*-axis. What will be the coordinates of *C* after the reflection?

A $(2, 7)$

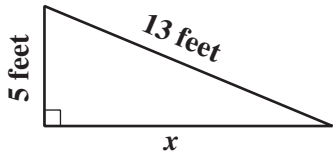
B $(7, 2)$

C $(-2, -7)$

D $(-2, 7)$

M10640

134. What is the value of x in the right triangle shown below?



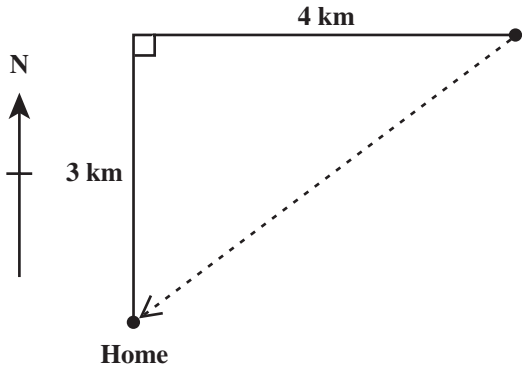
A 8 feet

B 12 feet

C 18 feet

D 23 feet

M03181



135. The club members hiked 3 kilometers north and 4 kilometers east, but then went directly home as shown by the dotted line. How far did they travel to get home?

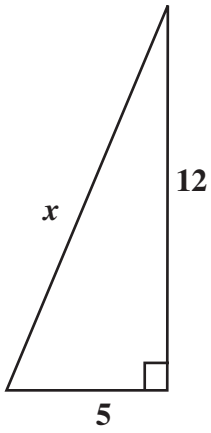
A 4 km

B 5 km

C 6 km

D 7 km

M00120



136. What is the value of x in the triangle shown above?

A 11

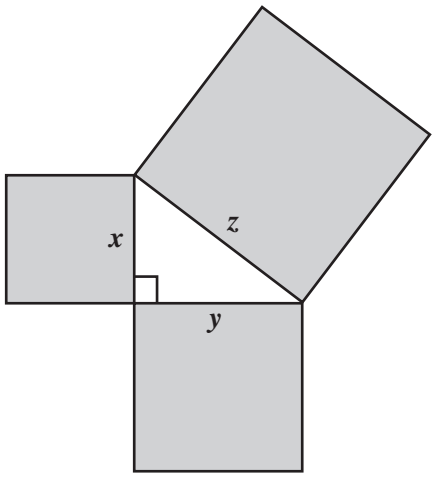
B 13

C 17

D 169

M02446

137. In the drawing below, the figure formed by the squares with sides that are labeled x, y, and z is a right triangle.



Which equation is true for all values of x, y, and z?

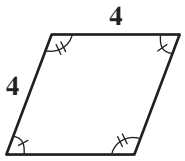
A $x + y = z$

B $x^2 + y^2 = z^2$

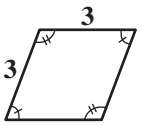
C $x^2 \cdot y^2 = z^2$

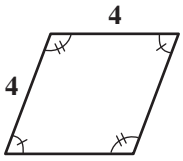
D $\frac{1}{2}xy = z$

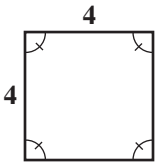
M25150

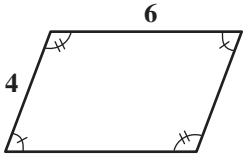


138. Which figure is congruent to the figure shown above?

A


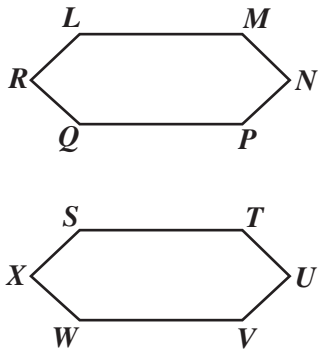
B


C


D


M00020

139. In the diagram below, hexagon *LMNPQR* is congruent to hexagon *STUVWX*.

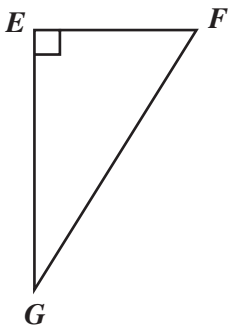


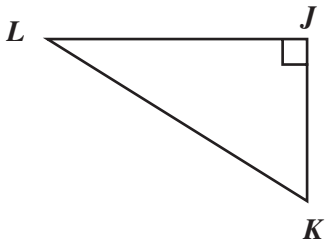
Which side is the same length as $\overline{MN}$?

A $\overline{NP}$
B $\overline{TU}$
C $\overline{UV}$
D $\overline{WX}$

M13069

140. If triangles *EFG* and *JKL* are congruent, then which two segments MUST be congruent?





A $\overline{EF}$ and $\overline{JK}$
B $\overline{EF}$ and $\overline{JL}$
C $\overline{FG}$ and $\overline{JK}$
D $\overline{FG}$ and $\overline{JL}$

M25163

Measurement and Geometry

Question Number	Correct Answer	Standard	School Year of Exam
100	A	7MG1.1	2002-2003
101	D	7MG1.1	2001-2002
102	D	7MG1.1	2001-2002
103	C	7MG1.1	2004-2005
104	D	7MG1.2	2001-2002
105	C	7MG1.2	2000-2001
106	D	7MG1.2	2005-2006
107	C	7MG1.2	2006-2007
108	A	7MG1.3	2001-2002
109	B	7MG1.3	2001-2002
110	A	7MG1.3	2003-2004
111	A	7MG1.3	2004-2005
112	D	7MG2.1	2001-2002
113	A	7MG2.1	2000-2001
114	B	7MG2.1	2000-2001
115	C	7MG2.1	2000-2001
116	D	7MG2.1	2000-2001
117	B	7MG2.1	2005-2006
118	D	7MG2.2	2001-2002
119	A	7MG2.2	2001-2002
120	A	7MG2.2	2000-2001
121	B	7MG2.2	2000-2001
122	C	7MG2.2	2004-2005
123	C	7MG2.3	2002-2003
124	C	7MG2.3	2003-2004
125	C	7MG2.3	2004-2005
126	D	7MG2.3	2006-2007
127	D	7MG2.4	2002-2003
128	D	7MG2.4	2000-2001
129	A	7MG2.4	2004-2005
130	B	7MG3.2	2000-2001
131	B	7MG3.2	2000-2001
132	C	7MG3.2	2003-2004
133	A	7MG3.2	2005-2006
134	B	7MG3.3	2002-2003
135	B	7MG3.3	2001-2002
136	B	7MG3.3	2000-2001
137	B	7MG3.3	2005-2006
138	B	7MG3.4	2001-2002
139	B	7MG3.4	2003-2004
140	A	7MG3.4	2006-2007

MATHEMATICAL REASONING

The following six California mathematics academic content standards from the Mathematical Reasoning strand are assessed on the CAHSEE by 8 test questions and are represented in this booklet by 22 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

NOTE: Each question in this strand also addresses a standard in one of the other five strands and is classified by that strand for purposes of reporting student scores. For example, the first question in the following set is classified as 7MR1.1 and also 7MG1.3.

GRADE 7 — MATHEMATICAL REASONING	
Standard Set 1.0	**Students make decisions about how to approach problems:**
1.1	Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, identifying missing information, sequencing and prioritizing information, and observing patterns.
1.2	Formulate and justify mathematical conjectures based on a general description of the mathematical question or problem posed.
Standard Set 2.0	**Students use strategies, skills, and concepts in finding solutions:**
2.1	Use estimation to verify the reasonableness of calculated results.
2.3	Estimate unknown quantities graphically and solve for them by using logical reasoning and arithmetic and algebraic techniques.
2.4	Make and test conjectures by using both inductive and deductive reasoning.
Standard Set 3.0	**Students determine a solution is complete and move beyond a particular problem by generalizing to other situations:**
3.3	Develop generalizations of the results obtained and the strategies used and apply them to new problem situations.

141. Chris drove 100 kilometers from San Francisco to Santa Cruz in 2 hours and 30 minutes. What computation will give Chris' average speed, in kilometers per hour?

A Divide 100 by 2.5.

B Divide 100 by 2.3.

C Multiply 100 by 2.5.

D Multiply 100 by 2.3.

M03164

A flower shop delivery van traveled these distances during one week: 104.4, 117.8, 92.3, 168.7, and 225.6 miles. How many gallons of gas were used by the delivery van during this week?

142. What other information is needed in order to solve this problem?

A The average speed traveled in miles per hour

B The cost of gasoline per gallon

C The average number of miles per gallon for the van

D The number of different deliveries the van made

M00138

143. A shipping company has 25 offices that shipped 60,000 packages last week. The offices were open 6 days and used 80,000 kilowatt-hours of electricity. Which pieces of information given above are necessary to find the average number of packages shipped per day last week?

A the number of offices and the number of packages

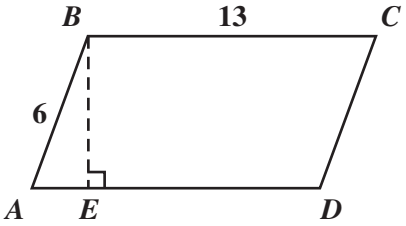
B the number of packages and the amount of electricity used

C the number of packages and the number of days open during the week

D the number of days open during the week and the amount of electricity used

M10538

144.



What additional information is needed to find the area of parallelogram *ABCD*? $(A = bh)$

A Length of $\overline{CD}$

B Length of $\overline{AD}$

C Length of $\overline{BE}$

D Perimeter of the parallelogram

M00204

145. If n is any odd number, which of the following is true about $n + 1$?

A It is an odd number.

B It is an even number.

C It is a prime number.

D It is the same number as $n - 1$.

M00155

146. The table below shows the flight times from San Francisco (S.F.) to New York (N.Y.).

Leave S.F. Time	Arrive N.Y. Time
8:30 A.M.	4:50 P.M.
12:00 noon	8:25 P.M.
3:30 P.M.	11:40 P.M.
9:45 P.M.	5:50 A.M.

Which flight takes the longest?

A The flight leaving at 8:30 A.M.

B The flight leaving at 12:00 noon

C The flight leaving at 3:30 P.M.

D The flight leaving at 9:45 P.M.

M00376

147. If a is a positive number and b is a negative number, which expression is always positive?

A $a - b$

B $a + b$

C $a \times b$

D $a \div b$

M10683

148. Use the addition problems below to answer the question.

$$\frac{1}{2}+\frac{1}{4}=\frac{3}{4}$$
$$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}=\frac{7}{8}$$
$$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}=\frac{15}{16}$$
$$\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\frac{1}{32}=\frac{31}{32}$$

Based on this pattern, what is the sum of $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\ldots+\frac{1}{1024}$?

A $\frac{1001}{1024}$

B $\frac{1010}{1024}$

C $\frac{1023}{1024}$

D $\frac{1025}{1024}$

M21115

149. The table below shows the number of visitors to a natural history museum during a 4-day period.

Day	Number of Visitors
Friday	597
Saturday	1115
Sunday	1346
Monday	365

Which expression would give the BEST estimate of the total number of visitors during this period?

A $500 + 1100 + 1300 + 300$

B $600 + 1100 + 1300 + 300$

C $600 + 1100 + 1300 + 400$

D $600 + 1100 + 1400 + 400$

M11112

150. Which is the BEST estimate of $326 \cdot 279$?

A 900

B 9,000

C 90,000

D 900,000

M00277

151. Marcus plans to buy a Compact Disc (CD) that has a regular price of $13.99. It is on sale for 10% off, but Marcus will have to pay 7% sales tax. Which is the MOST reasonable estimate of the total cost of the CD including tax?

A $12.50

B $13.50

C $14.50

D $15.50

M11869

152. The temperature on a mountain peak was 7 degrees Fahrenheit $(°F)$ at 6:00 p.m. By 8:00 p.m., the temperature had dropped to $0°F$. If the temperature continued to drop at about the same rate, which is the BEST estimate of the temperature at 11:00 p.m.?

A $-20°F$

B $-14°F$

C $-10°F$

D $-9°F$

M20451

153. Sally paid $1.89 for 5 plums. About how many plums would she get for $10?

A 4

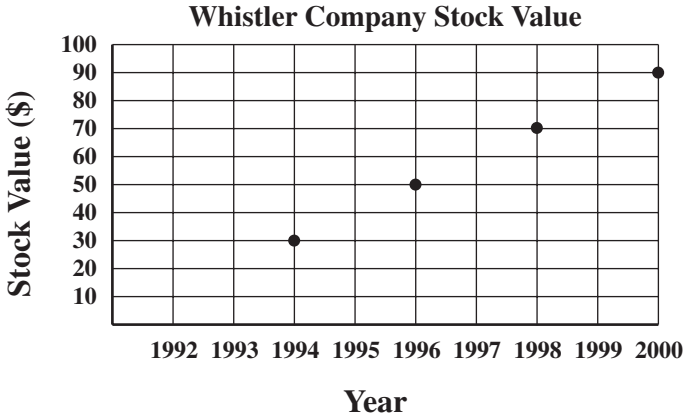
B 5

C 10

D 25

M25031

154. The graph below shows the value of Whistler Company stock at the end of every other year from 1994 to 2000.



From this graph, which of the following was the most probable value of Whistler Company stock at the end of 1992?

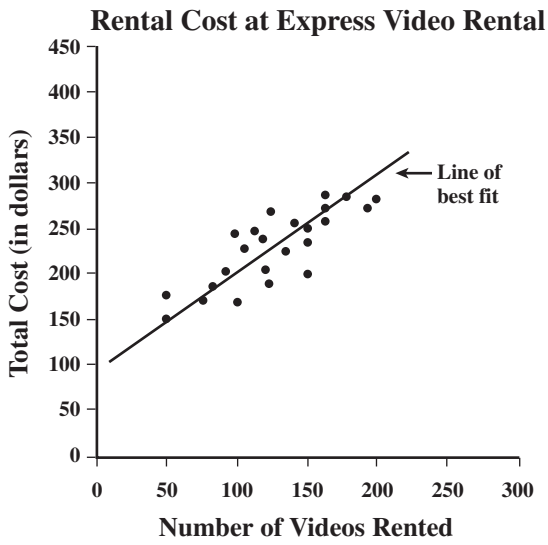
A −$10

B $1

C $10

D $20

M02898



155. Using the line of best fit shown on the scatterplot above, which of the following best approximates the rental cost per video to rent 300 videos?

A $3.00

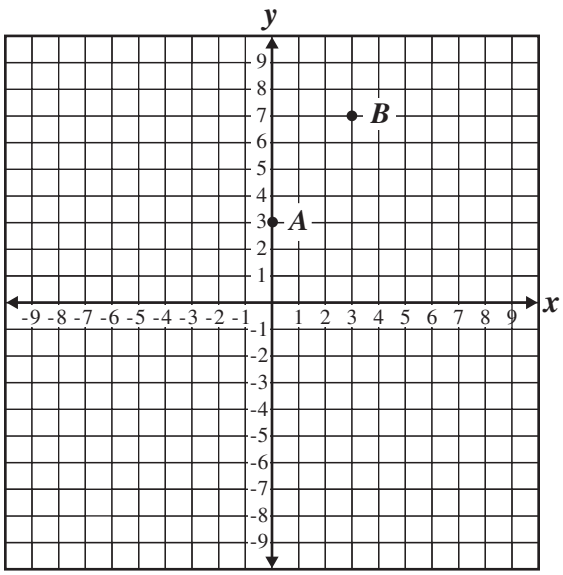
B $2.50

C $2.00

D $1.50

M02209

156. If a line passes through the points *A* and *B* shown below, approximately where does the line cross the *x*-axis?



A between -3 and -2

B between 0 and -1

C between 0 and 1

D between 1 and 2

M10702

157. Michelle read a book review and predicted that the number of girls who will like the book will be more than twice the number of boys who will like the book. Which table shows data that support her prediction?

A

	Number Who Liked the Book
Boys	35
Girls	40

C

	Number Who Liked the Book
Boys	70
Girls	25

B

	Number Who Liked the Book
Boys	35
Girls	80

D

	Number Who Liked the Book
Boys	40
Girls	40

M11882

158. The table below shows values for x and corresponding values for y.

x	y
21	3
14	2
28	4
7	1

Which of the following represents the relationship between x and y?

A $y = \frac{1}{7}x$

B $y = 7x$

C $y = x - 6$

D $y = x - 18$

M00377

159. The winning number in a contest was less than 50. It was a multiple of 3, 5, and 6. What was the number?

A 14

B 15

C 30

D It cannot be determined.

M00393

160. Lia used the following process to find the slope of the line described by the equation $3y + 5x = 12$.

Step 1: Subtract $5x$ from each side.	$3y = -5x + 12$
Step 2: Divide each side by 3.	$y = -\frac{5}{3}x + 4$
Step 3: The slope of $y = mx + b$ is m.	**Slope is** $-\frac{5}{3}$

According to Lia's method, which expression gives the slope of the line described by the equation $ax + by = c$?

A $-\frac{a}{b}$

B $\frac{a}{b}$

C $-\frac{b}{a}$

D $\frac{b}{a}$

M11892

Len runs a mile in 8 minutes. At this rate how long will it take him to run a 26-mile marathon?

161. Which of the following problems can be solved using the same arithmetic operations that are used to solve the problem above?

A Len runs 26 miles in 220 minutes. How long does it take him to run each mile?

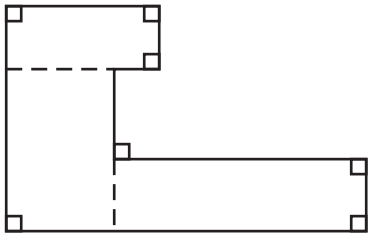
B A librarian has 356 books to place on 18 shelves. Each shelf will contain the same number of books. How many books can the librarian place on each shelf?

C A cracker box weighs 200 grams. What is the weight of 100 boxes?

D Each basket of strawberries weighs 60 grams. How many baskets can be filled from 500 grams of strawberries?

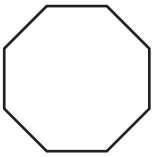
M00137

162. Mia found the area of this shape by dividing it into rectangles as shown.

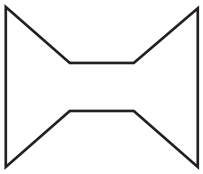


Mia could use the same method to find the area for which of these shapes?

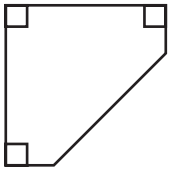
A



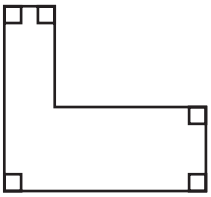
C



B



D



M25128

Mathematical Reasoning

Question Number	Correct Answer	Standard 1	Standard 2	School Year of Exam
141	A	7MR1.1	7MG1.3	2001-2002
142	C	7MR1.1	7NS1.2	2000-2001
143	C	7MR1.1	7MG1.3	2005-2006
144	C	7MR1.1	7MG2.1	2006-2007
145	B	7MR1.2	7AF1.1	2001-2002
146	B	7MR1.2	7MG1.1	2000-2001
147	A	7MR1.2	7AF1.1	2003-2004
148	C	7MR1.2	7NS1.2	2005-2006
149	C	7MR2.1	7NS1.2	2002-2003
150	C	7MR2.1	7NS1.2	2000-2001
151	B	7MR2.1	7NS1.7	2003-2004
152	C	7MR2.1	7AF4.2	2004-2005
153	D	7MR2.1	7AF4.2	2005-2006
154	C	7MR2.3	7AF1.5	2000-2001
155	D	7MR2.3	7PS1.2	2001-2002
156	A	7MR2.3	7AF3.3	2004-2005
157	B	7MR2.4	6PS2.5	2006-2007
158	A	7MR2.4	7AF1.1	2002-2003
159	C	7MR2.4	7NS1.2	2000-2001
160	A	7MR3.3	7AF4.1	2002-2003
161	C	7MR3.3	7NS1.2	2001-2002
162	D	7MR3.3	7MG2.2	2004-2005

ALGEBRA I

The following ten California mathematics academic content standards from the Algebra I strand are assessed on the CAHSEE by 12 test questions and are represented in this booklet by 35 released test questions. These questions represent only a few of the ways in which these standards may be assessed on the CAHSEE.

ALGEBRA I	
Standard Set 2.0	**Students understand and use such operations as taking the opposite, finding the reciprocal, and taking a root, ~~and raising to a fractional power~~. They understand and use the rules of exponents.***
Standard Set 3.0	**Students solve equations and inequalities involving absolute values.**
Standard Set 4.0	**Students simplify expressions before solving linear equations and inequalities in one variable, such as $3(2x-5) + 4(x-2) = 12$.**
Standard Set 5.0	**Students solve multistep problems, including word problems, involving linear equations and linear inequalities in one variable and provide justification for each step.**
Standard Set 6.0	**Students graph a linear equation and compute the *x*- and *y*- intercepts (e.g., graph $2x + 6y = 4$). ~~They are also able to sketch the region defined by linear inequality (e.g., they sketch the region defined by $2x + 6y < 4$).~~***
Standard Set 7.0	**Students verify that a point lies on a line, given an equation of the line. Students are able to derive linear equations ~~by using the point-slope formula.~~***
Standard Set 8.0	**Students understand the concepts of parallel lines ~~and perpendicular lines~~ and how their slopes are related. ~~Students are able to find the equation of a line perpendicular to a given line that passes through a given point.~~***
Standard Set 9.0	**Students solve a system of two linear equations in two variables algebraically and are able to interpret the answer graphically. Students are able to solve a system of two linear inequalities in two variables and to sketch the solution sets.**
Standard Set 10.0	**Students add, subtract, multiply, and divide monomials and polynomials. Students solve multistep problems, including word problems, by using these techniques.**
Standard Set 15.0	**Students apply algebraic techniques to solve rate problems, work problems, and percent mixture problems.**

* The crossed-out portion of this standard is not assessed on the CAHSEE, but is still included in grade-level standards.

163. If $x = -7$, then $-x =$

A -7

B $-\frac{1}{7}$

C $\frac{1}{7}$

D 7

M02863

164. The perimeter, P, of a square may be found by using the formula $\left(\frac{1}{4}\right)P = \sqrt{A}$, where A is the area of the square. What is the perimeter of the square with an area of 36 square inches?

A 9 inches

B 12 inches

C 24 inches

D 72 inches

M00057

165. What is the reciprocal of $\frac{ax^2}{y}$?

A $-\frac{ax^2}{y}$

B $-\frac{y}{ax^2}$

C $\frac{ax^2}{y}$

D $\frac{y}{ax^2}$

M13174

166. If x is an integer, what is the solution to $|x - 3| < 1$?

A $\{-3\}$

B $\{-3, -2, -1, 0, 1\}$

C $\{3\}$

D $\{-1, 0, 1, 2, 3\}$

M03035

167. If x is an integer, which of the following is the solution set for $3|x| = 15$?

A $\{0, 5\}$

B $\{-5, 5\}$

C $\{-5, 0, 5\}$

D $\{0, 45\}$

M00059

168. What are all the possible values of x such that $10|x| = 2.5$?

A 0.25 and -0.25

B 4 and -4

C 4.5 and -4.5

D 25 and -25

M12992

169. Which of the following is equivalent to $4(x+5)-3(x+2)=14$?

A $4x+20-3x-6=14$

B $4x+5-3x+6=14$

C $4x+5-3x+2=14$

D $4x+20-3x-2=14$

M02936

170. Which of the following is equivalent to $9-3x>4(2x-1)$?

A $13<11x$

B $13>11x$

C $10>11x$

D $6x>0$

M02531

$$\frac{20}{x}=\frac{4}{x-5}$$

171. Which of the following is equivalent to the equation shown above?

A $x(x-5)=80$

B $20(x-5)=4x$

C $20x=4(x-5)$

D $24=x+(x-5)$

M02403

172. Which of the following is equivalent to $1-2x>3(x-2)$?

A $1-2x>3x-2$

B $1-2x>3x-5$

C $1-2x>3x-6$

D $1-2x>3x-7$

M02231

173. Which equation is equivalent to $\frac{x+3}{8}=\frac{2x-1}{5}$?

A $5x+3=16x-1$

B $5x+15=16x-8$

C $8x+3=10x-1$

D $8x+24=10x-5$

M13117

174. Colleen solved the equation $2(2x+5)=8$ using the following steps.

Given: $2(2x+5)=8$

Step 1: $4x+10=8$

Step 2: $4x=-2$

Step 3: $x=-\frac{1}{2}$

To get from Step 2 to Step 3, Colleen—

A divided both sides by 4.

B subtracted 4 from both sides.

C added 4 to both sides.

D multiplied both sides by 4.

M03139

175. Solve for x.

$$5(2x-3)-6x<9$$

A $x<-1.5$

B $x<1.5$

C $x<3$

D $x<6$

M02938

176. Which inequality represents the solution of $(11x + 2) + (6x + 4) + (x + 5) > 90$?

A $x > \frac{79}{18}$

B $x > \frac{79}{17}$

C $x > \frac{101}{18}$

D $x > \frac{101}{17}$

M20669

177. What is the *y*-intercept of the line $2x - 3y = 12$?

A (0, −4)

B (0, −3)

C (2, 0)

D (6, 0)

M02591

178. What are the coordinates of the *x*-intercept of the line $3x + 4y = 12$?

A (0, 3)

B (3, 0)

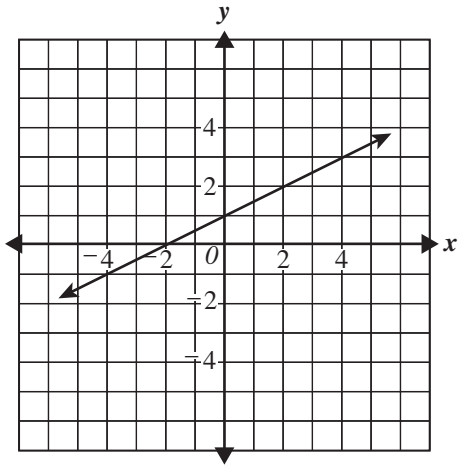
C (0, 4)

D (4, 0)

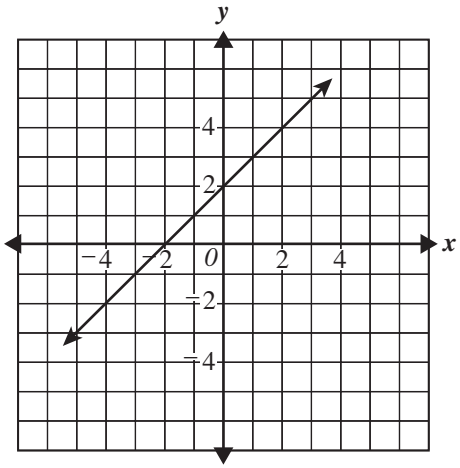
M02462

179. Which of the following is the graph of $y = \frac{1}{2}x + 2$?

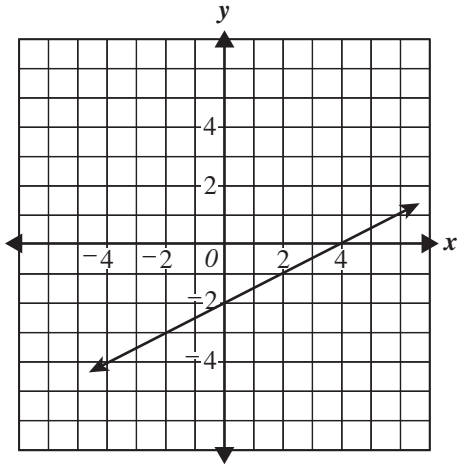
A



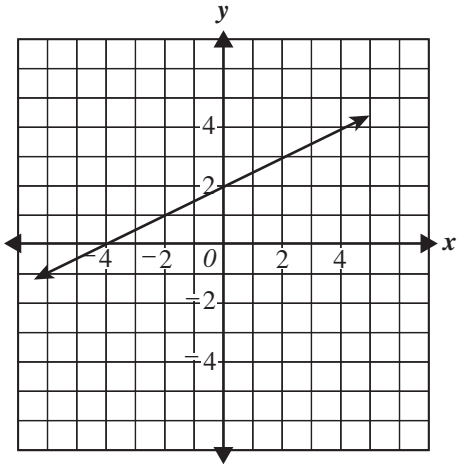
C



B



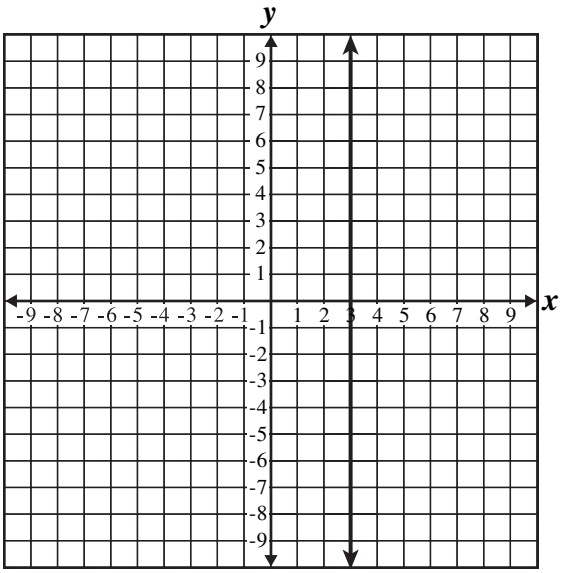
D



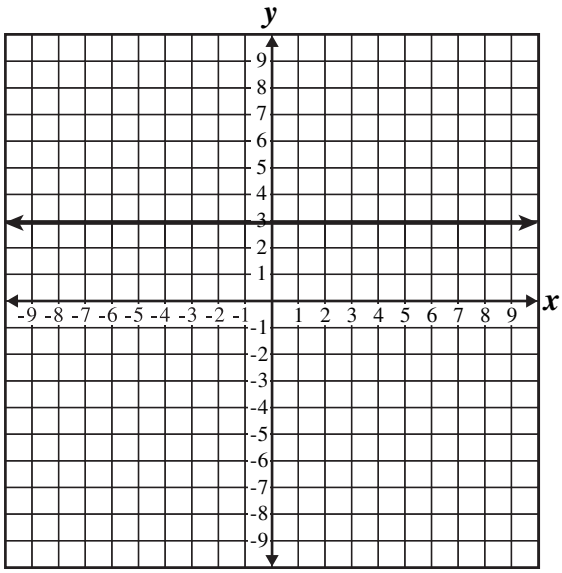
M02026

180. What is the graph of the equation $x = 3$?

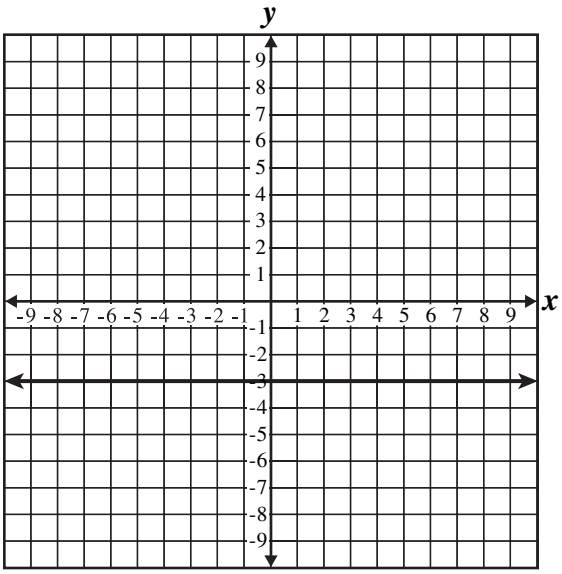
A



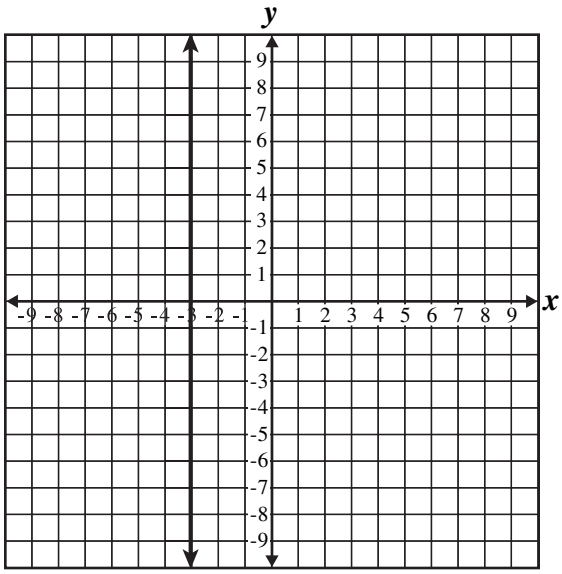
C



B



D



M13541

181. Which of the following points lies on the line $y = x$?

A $(-4, -4)$

B $(-4, 4)$

C $(4, -4)$

D $(-4, 0)$

M02594

182. Which of the following points lies on the line $4x + 5y = 20$?

A $(0, 4)$

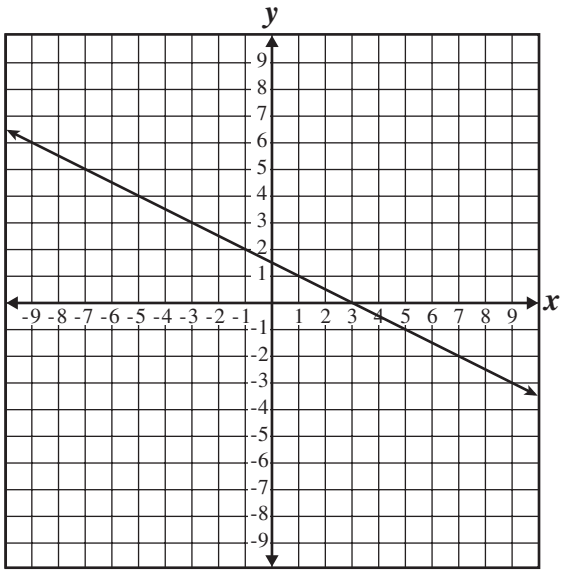
B $(0, 5)$

C $(4, 5)$

D $(5, 4)$

M02565

183. Which equation represents the line on the graph below?



A $x + 2y = 3$

B $x + 2y = 5$

C $2x + y = 9$

D $4x + 2y = 3$

M22072

184. What is the slope of a line parallel to the line $y = \frac{1}{3}x + 2$?

A -3

B $-\frac{1}{3}$

C $\frac{1}{3}$

D 2

M02653

185. Which of the following statements describes parallel lines?

A Same y-intercept but different slopes

B Same slope but different y-intercepts

C Opposite slopes but same x-intercepts

D Opposite x-intercepts but same y-intercept

M02610

186. Which of the following could be the equation of a line parallel to the line $y = 4x - 7$?

A $y = \frac{1}{4}x - 7$

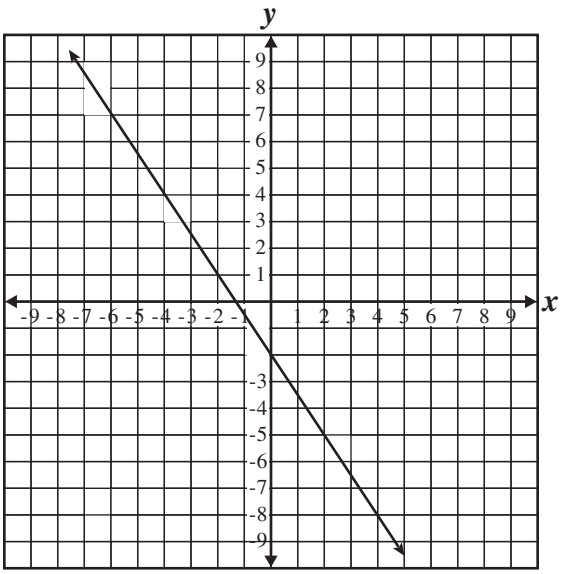
B $y = 4x + 3$

C $y = -4x + 3$

D $y = -\frac{1}{4}x - 7$

M02651

187. What is the slope of a line parallel to the line below?



A $-\frac{3}{2}$

B $-\frac{2}{3}$

C $\frac{2}{3}$

D $\frac{3}{2}$

M12410

$$\begin{cases} 7x + 3y = -8 \\ -4x - y = 6 \end{cases}$$

188. What is the solution to the system of equations shown above?

A $(-2, -2)$

B $(-2, 2)$

C $(2, -2)$

D $(2, 2)$

M02956

$$\begin{cases} y = 3x - 5 \\ y = 2x \end{cases}$$

189. What is the solution of the system of equations shown above?

A (1, −2)

B (1, 2)

C (5, 10)

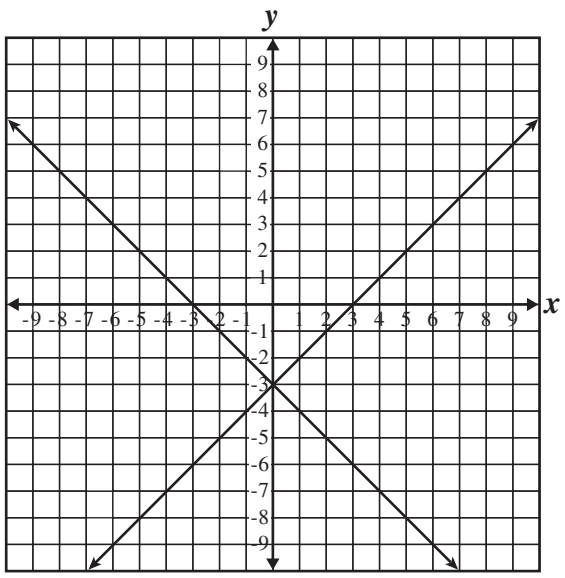
D (−5, −10)

M02649

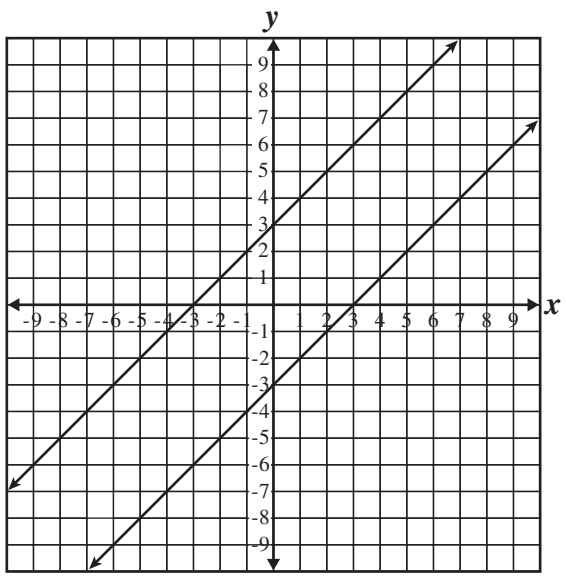
190. Which graph represents the system of equations shown below?

$$y = -x + 3$$
$$y = x + 3$$

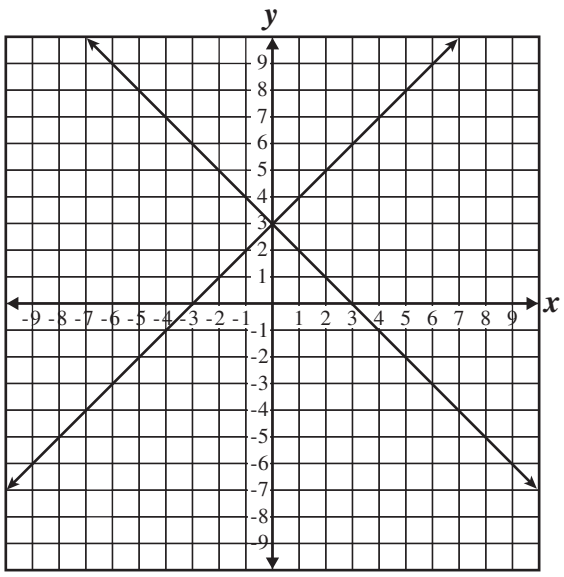
A



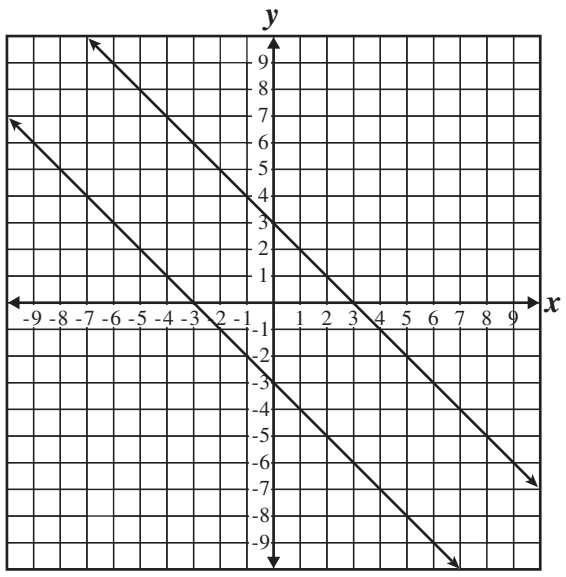
C



B



D



M12449

191. Simplify.

$$\left(x^2 - 3x + 1\right) - \left(x^2 + 2x + 7\right)$$

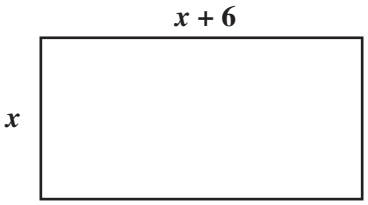
A $x - 6$

B $-x + 8$

C $-5x - 6$

D $2x^2 - x + 8$

M03355



192. The length of the rectangle above is 6 units longer than the width. Which expression could be used to represent the area of the rectangle?

A $x^2 + 6x$

B $x^2 - 36$

C $x^2 + 6x + 6$

D $x^2 + 12x + 36$

M00402

193. Simplify.

$$\frac{4x^3 + 2x^2 - 8x}{2x}$$

A $2x^2 + x - 4$

B $4x^2 + 2x - 8$

C $2x^2 + 2x^2 - 8x$

D $8x^4 + 4x^3 - 16x^2$

M03354

194. Mr. Jacobs can correct 150 quizzes in 50 minutes. His student aide can correct 150 quizzes in 75 minutes. Working together, how many minutes will it take them to correct 150 quizzes?

A 30

B 60

C 63

D 125

M03000

195. Ricardo runs 10 miles each Saturday. If he doubles his usual speed, he can run the 10 miles in one hour less than his usual time. What is his usual speed?

A 2 miles per hour

B 3 miles per hour

C 4 miles per hour

D 5 miles per hour

M02561

196. Yoshi has exactly one dollar in dimes (10 cents) and nickels (5 cents). If Yoshi has twice as many dimes as nickels, how many nickels does she have?

A 4

B 8

C 12

D 15

M02410

197. Diane delivers newspapers for $5 a day plus $0.04 per newspaper delivered. Jeremy delivers newspapers for $2 a day plus $0.10 per newspaper delivered. How many newspapers would Diane and Jeremy each need to deliver in order to earn the same amount?

A 30

B 50

C 75

D 83

M02614

Question Number	Correct Answer	Standard	School Year of Exam
163	D	1A2.0	2001-2002
164	C	1A2.0	2001-2002
165	D	1A2.0	2004-2005
166	C	1A3.0	2001-2002
167	B	1A3.0	2000-2001
168	A	1A3.0	2006-2007
169	A	1A4.0	2001-2002
170	B	1A4.0	2001-2002
171	B	1A4.0	2000-2001
172	C	1A4.0	2000-2001
173	B	1A4.0	2006-2007
174	A	1A5.0	2002-2003
175	D	1A5.0	2001-2002
176	A	1A5.0	2005-2006
177	A	1A6.0	2000-2001
178	D	1A6.0	2000-2001
179	D	1A6.0	2001-2002
180	A	1A6.0	2005-2006
181	A	1A7.0	2002-2003
182	A	1A7.0	2001-2002
183	A	1A7.0	2006-2007
184	C	1A8.0	2001-2002
185	B	1A8.0	2000-2001
186	B	1A8.0	2000-2001
187	A	1A8.0	2004-2005
188	B	1A9.0	2001-2002
189	C	1A9.0	2000-2001
190	B	1A9.0	2003-2004
191	C	1A10.0	2002-2003
192	A	1A10.0	2000-2001
193	A	1A10.0	2003-2004
194	A	1A15.0	2001-2002
195	D	1A15.0	2004-2005
196	A	1A15.0	2005-2006
197	B	1A15.0	2006-2007

Mathematics Released Test Questions

January 2008

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